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The BUILDER

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✣ ILLUSTRATED ✣ WEEKLY ✣ MAGAZINE ✣

FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR, SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

"Every man's proper mansion-house, and home, being the theater of his hospitality, the seate of selfe-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private princedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON.

"Our English word TO BUILD is the Anglo-Saxon Bylðan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVERSIONS OF PURLEY.

"Always be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE.

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The Builder

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Superintendence.

IN the erection of a large building the direct duties of superintendence devolve upon the clerk of works, but it is even in that case incumbent upon the architect to visit the building with tolerable frequency, for his drawings and specifications will not always be accurately interpreted, even by a clerk of works who has been under him for years. It is possible, too, that clerks of works may not be always worthy of that implicit confidence which architects, sometimes to their own loss and discredit, are only too willing to place in them. Moreover, clients consider their architect's repeated presence on the building a necessity; they have often a blind belief in his omniscience and omnipercipience, and cannot think that all will be well if the master-mind be not there to oversee.

But it is not always that an architect has the pleasure of carrying out large buildings, and of being relieved of much of the irksomeness of superintendence by an efficient clerk of works. In every practice there are many buildings which are too small to warrant the employment of a clerk of works, and it is in supervising the erection of these that an architect needs all the care, watchfulness, honesty, and decision which he can command. If, again, the work be let in trades to different contractors, the architect's difficulty reaches its maximum. The proprietor, however, expects everything to be done according to drawings and specifications, and really believes that his architect will see to it that such is the case. Wightwick, in his "Hints to Young Architects," says, "a gentleman . . . . will . . . . be inclined to visit upon his architect those failures in *particular* construction which only good workmen can insure, under the direction of the contracting builder, and the supervision of an ever-watchful clerk of works, exclusively occupied on one job. It will be well, therefore, for the architect at once to undeceive his employer in this last particular." And, again—"when an employer will not take upon himself the responsibility of trusting to the efficiency of the contractor and his men, the architect is bound to insist on the engagement of a well-tried clerk of the works. The author of these 'Hints' has suffered so much from a too-ready desire to save his employer the charge of a constant supervisor, that he cannot too strongly urge upon those whom he now addresses the advisability of having a clear understanding with their patrons on this point." We wonder if an employer ever did arrive at any clear understanding on the point, other than this, that the architect is responsible from beginning to end. The claim of the architect to the possession of all drawings and specifications is supported by the argument that the client required a building, not paper; that the latter represents but a means to an end, and is as much the property of the architect as the chisel is of the mason or the plane of the joiner; and this argument,—not altogether flawless, let us say,—acknowledges the architect's responsibility for the proper erection of a building in accordance with his client's requirements. We do not see that an architect can rightly claim possession of the drawings, and at the same time disclaim responsibility for the work. However, disclaimer or no disclaimer, it will always be found that, whether a clerk of works be employed or not, clients unhesitatingly consider that architects have neglected their duties if buildings exhibit faults of construction, however minute, and are not erected strictly in accordance with the original drawings and specifications, or such modifications thereof as the clients themselves have approved. A recent resolution of the London School Board, "calling on their former architect, Mr. Robson, to make good the loss arising from defective foundations in the Broad-street Schools," shows this very plainly. Taking into consideration the somewhat peculiar nature of Mr. Robson's appointment, this resolution was a mistaken one, but the fact remains that a majority of the Board declared their conviction of the architect's responsibility for bad workmanship and deficient materials. It was stated in the *Builder* at the time (July 21, 1888), that "if the case had been that of an architect in ordinary practice on his own account, it might reasonably be said that he ought to have given personal inspection to so important a matter as foundations; every architect in ordinary practice ought to do that."

This unchangeable and, to our mind, quite unblamable, determination of clients respecting an architect's responsibility, is almost, if not altogether, universal. It is vain for an architect to contend against it; on the contrary, he ought to accept the position fearlessly, and do his utmost to ensure the proper realisation of his schemes. It will be better for his own future practice; for, be a house never so picturesque, if the drains smell it will be an abomination to its owner, and the latter will become a thorn in the architect's side. Architects lose more clients through

carelessness of superintendence than from any other cause.

There is another reason why architects, especially in country towns, can ill afford to neglect the arduous duties of superintendence. We refer to the existence of that great army of men, chiefly, we believe, joiners, who, on the strength of their "practical knowledge" of the building trades, "creep and intrude and climb into the fold." The artistic faculty is in most of them wofully lacking, but, despite the ugliness of their productions, they prosper, and one reason of their success is this: the belief which men have that their "practical knowledge" (magical words!) will ensure more searching superintendence of work; on the principle, doubtless, of setting a thief to catch a thief.

The architect will do well also to remember that additions to his works by brother-practitioners at some future time will make known his shortcomings. But we do not wish to insist upon the necessity for close supervision merely because that would be to the architect's pecuniary interest; there is a higher motive than that. It is in truth a question not so much of self-interest as of duty; the architect is engaged to superintend the erection of a building as well as to design it, and if he neglect the former he is, like an idle servant, dealing unjustly with his employer, receiving wages for work which he does not perform. If the architect recognise this truth and act up to it, it will be well with him; if not—with all sorrow be it said—he scamps his work no less than does the dishonest builder, and is not acting for the honour and best interests of his great profession.

The necessity for effectual superintendence having now been stated, the question remains for our determination,—how can an architect with least possible annoyance to proprietor, contractor, and himself, ensure the careful and honest erection of buildings without the constant supervision of a clerk of works?

In February last Mr. T. M. Rickman read a paper at the Institute on "Writing a Specification," and the speech of Mr. Arthur Cates in the discussion which followed, is thus reported:—"From the paper they gathered that Mr. Rickman considered that the first qualification of an architect was to possess patience, and after that the most essential quality was decision, and in the latter quality *he feared architects were often wanting, especially in insisting that the work should be executed as specified.*" Let us take these italicised words as a sort of text, calling attention first, however, to the further qualification, which Prof. Roger Smith pointed out to be still more important, to wit, knowledge.

Every architect learns by experience,—more or less bitter,—the difficulties of superintendence, and as the years pass discovers how prolific of such difficulties are the unconsidered clauses of a specification. It is a golden rule for all students that, when drawing a ground-floor plan, every line must be studied in its relation not only to the remaining portions of that plan, but also to all other plans up to the roof-plan, and to all elevations. A similar rule would be this,—in writing a specification every word must be studied not only in its relation to other words and to the drawings, but also in its relation to the building and the superintendence of its erection. All words such as "proper," "sufficient," "strong," "good," and the like, which convey no definite meaning, must be avoided, and strict definitions must be given of terms, which are variously interpreted by different architects and builders,—"prime cost," "best," "perfect," "complete." In specifying that wood shall be "free from sap," the architect is demanding something of which the getting will cause him endless trouble; when he says that it must be "without large dead knots" he binds himself to pass small dead knots, and also large knots which are not dead, although such is probably not his intention. We often see in specifications of woodwork that "all measurements refer to finished sizes," and in many cases it is absolutely impossible to obtain material of the specified scantling without an unwarrantable waste of a client's or a builder's money. A cut of an ordinary circular saw wastes, roughly speaking, $\frac{1}{8}$ in. of wood; thus, a plank 11 in. by 3 in. will cut into four pieces 3 in. by about $2\frac{5}{8}$ in., and the size of such a piece when planed on all sides will be probably less than $2\frac{7}{8}$ in. by $2\frac{1}{2}$ in. For an architect to write such a clause, and then specify a piece of planed deal 3 in. thick betrays great thoughtlessness, and if he obstinately adheres to the letter of the specification, the builder will have to pay heavily in a large contract for the architect's original blunder. The thicknesses of floorboards and doors may prove a bone of contention if the architect has specified them to be 1 in., $1\frac{1}{4}$ in., $1\frac{1}{2}$ in., and so on; it is better to ask for $\frac{7}{8}$ in., $1\frac{1}{8}$ in., $1\frac{3}{8}$ in., and so on. It is foreign, however, to our purpose to enter into the hundred and one details that must be considered in writing specifications; but the broad fact must be stated that the most exasperating difficulties of superintendence are those which arise from the vagueness, inaccuracy, or incompleteness of the specification, for these faults come home to roost with the architect himself. If the writing of the specification be scamped, depend upon it, the work itself will be scamped. Do not specify "*best* red deal," and be content with "fourths" and "fifths"; but be very careful to specify exactly what you require, and see that you get it.

In the retirement of the "private office" it is comparatively easy to decide upon the merits of rival materials; to determine the quality of each according to the character of the building, so that everything shall be quite good enough for its purpose, but not extravagantly so; to say that this method of construction will be better than that; and to demand the special fittings of one firm in preference to all others. The architect sitting in his own little court is not wearied by the cries of an irate plaintiff or an exasperated defendant, but calmly judges each question of material and construction as it arises. He is unbiassed, comparatively unflurried, and deliberately, to the best of his knowledge and judgment, specifies whatever is most adapted to the special needs of the building which he is about to erect. It is this coolness, this freedom from disturbing influences, upon which we wish to lay particular stress. It is true that it is at times necessary to deviate from a specification, however carefully it may have been written, but it is equally true that at the time of writing a specification the experienced architect is, on the whole, more able to see clearly and without prejudice what is best for his client than at any subsequent time. His thoughts are concentrated on the work then in a manner they will not be again. Soon other buildings thrust themselves upon his attention, and in a very few weeks he forgets the motives which induced him to write this clause or that clause, and would forget a great part of those decisions which had cost him so much thought, if the specification were not before him in black and white. Again, when the building is being erected, the architect is, to some extent, however unconsciously, under the influence of the contractor; and the latter, by plausible pretexts and persistent attempts, is often able to obtain the architect's sanction to variations of the work which are probably to the contractor's benefit, and possibly to the proprietor's loss. During the preparation of the drawings and specifications the client's influence is paramount, but after the contract is signed it usually happens that the contractor is seen a dozen times while the client is seen once,—this is especially true in reference to works carried out for bodies of men,—and, unless the architect be very wary, the contractor's influence waxes while the client's wanes. The fact, too, that for one building transaction with any one client the architect may have half a score with a successful contractor tends to the same result.

These three reasons—the unbiassed deliberawith which a specification is (or ought to be) written, the absorption of thought by new work at a later time, and the subtle influence of the contractor—seem to us so cogent that we recommend the architect never to alter a specification except after the very gravest consideration. Moreover, when an architect prepares a specification, he does it as agent for his client; he provides for his requirements as well and as economically as he can, and translates these requirements into technical language: but as soon as the specification is accepted by proprietor and builder as the basis of a contract the architect's position changes; his specification becomes a legal document, and he the person appointed to see that the work is carried out in accordance therewith, and also (often enough) in case of dispute to act as arbiter between the two contracting parties. The duty he owes to his client compels him to insist that every detail be completed as well as specified; his duty as an upright man peremptorily declares that he shall not attempt, to the contractor's loss, to read into a vague specification a meaning which the words will not rightly bear. There are cases where an architect has laid the punishment for his own carelessness upon the back of a poor contractor, or has even connived at inferior work in order that the builder should not claim an extra for additional labour caused by constructional errors, for which the architect was responsible. In the former case the architect is grossly unjust; in the latter, fear of a client's displeasure makes him disingenuous, and causes him to sacrifice his employer's interests to hide his own mistakes; he loses his integrity, and with it the contractor's good opinion, for he has joined with him in doing an underhand action.

To young architects we would say, let your drawings be accurate and complete; let your specifications be written carefully and deliberately; let them contain, as clearly and simply as your knowledge of the English language will permit, all the information which is necessary for the thorough conveyance of your ideas on every detail of the projected work; and then, having done all this, make up your mind to adhere to the drawings and specifications unless absolutely compelled by uncontrollable circumstances or by increase of knowledge, to alter them. If you do this, superintendence will be rid of some, at any rate, of its difficulties.

We have more to say on the subject in a subsequent article.

SCHOOL-PLANNING OF SECONDARY SCHOOLS FOR DAY BOYS.

BY A HEAD MASTER.

THE following paper is an attempt to describe the requirements of the schoolmasters who have to use Secondary, or what are sometimes called High schools. Mr. Robson has written a book mainly on the planning of elementary schools; and Mr. Robins mainly on technical schools; but I do not know of any attempt to deal with higher schools specially. As to my own qualifications, I may say that I am myself head master of a large higher school, and that I have visited most of the high schools in Paris, and here and there in Belgium, Germany, and Scandinavia. I am inclined to think that, of all the day schools, those in Stockholm and Gothenburg are the most perfect and complete in plan; while, of the boarding schools, the École Monge, in Paris, is by far the most perfect in arrangement. It is worth mention that the head master of the latter school had a very large influence in settling the plans.

School arrangements may be looked at from three points of view, according as they facilitate the work of the head master, teachers, or pupils. Now the most important work of the head master is supervision. Indeed, in most Continental schools he does not teach at all; in English schools he teaches too much. Shut up in his sixth form room he may be giving a good lesson, while, perhaps, ten or twenty assistants may be giving bad ones. He ought, indeed, to teach the sixth form boys to such an extent as to keep thoroughly in touch

with them; but his main task is, or should be, supervision. He is better employed in teaching his assistant-masters than in teaching his boys. But supervision means much more than this. He has to supervise not only all the teaching, but much of the discipline of the school. So long, indeed, as the boys are shut up in their respective class-rooms, the assistant-masters are mainly responsible for discipline. But when the school is assembled together, *e.g.*, at prayers, or when all the boys are entering the building or leaving it, then the head master is mainly responsible. Also when the classes are redistributed at the change of lessons, when boys are passing about for various reasons, it is the head master, with his porter or discipline master, who is responsible. If you wish to make his task of supervision difficult, then build all the class-rooms in a line, as in Reading School, so that the boys may have far to go in changing classes; and you may connect the line of class-rooms with a long echoing corridor,—convenient for a stampede, for hustling, for running races. Narrow corridors especially facilitate hustling. Also sharp turns in a corridor will bring classes into sudden collision and riot at change of lessons. Nor will it be possible to detect the ringleaders if the corridor is dark. Moreover, a good deal of quiet bullying may be done in a dark corridor. While the head master is in one corridor the riot can be started in another. Also, if the head master's private room is properly sequestered, the boys can be noisy with safety.

I may as well make a list of a head master's chief foes as regards discipline. They are (1) disorder and noise; (2) bullying; (3) petty larceny; (4) indecent writing. In coping with all these the architect can greatly aid him, or can render good discipline almost impossible. I have said enough to show that to cope with disorder or bullying, the fewer corridors we have the better. But it should be remembered that horse-play, practical joking, and bullying occur in the playground and outbuildings also. Every corner, therefore, of the playground should be visible from the head master's room and from some of the class-rooms. Disorder, too, is very likely to occur at the entrances and exits of the school; these, therefore, should be commanded from the head master's room. It follows, then, that the administrative block should be so placed that it commands a view of the main entrances to the school, the playground, the hall, and the corridors. By the administrative block I mean the four rooms which are assigned (1) to the head master for interviews with parents, teachers, and pupils; (2) to the secretary, with shelving for school stationery, &c.; (3) to the assistant-masters, with room for their hats and coats, and for the school library; (4) for the porter or discipline master, with space for maps, tools, stores, &c. We may say that the porter, the secretary, and the head master form the special disciplinary staff. They must, therefore, be housed centrally, and their rooms must not be far away from one another, as the head master will be continually requiring to communicate with the porter and the secretary. The porter, like the head master, should be so placed as to be able to keep an eye on every boy who attempts to enter or leave the school, who is loafing in a corridor, or is outside of his class-room on any pretext. It is especially important that the porter should have a view from his room of the latrines and urinals, and of every one who enters or leaves them.

Now I come to the third offence, not very common, and happily confined as a rule to small deer,—I mean petty larceny. This takes place mainly in the central cloak-room. There is nothing more difficult to stop than this petty larceny; and it occurs because it is impossible to supervise the cloak-room adequately. The porter's other duties make it impossible for him to be always on guard in the cloak-room. In addition to this trouble, much disorder and confusion arises on a wet day, before several hundred boys can find their own overcoats and umbrellas, many of them being much alike. The remedy is to abolish the central cloak-room altogether; and instead of it, to attach a separate cloak-room to each class-room, and put it in charge of the master who teaches in that room. It should be about 6 ft. wide, and should run the whole length of the class-room. It may be 9 ft. high, or it may be carried up to the same height as the class-room. It should be separated from the class-room by a wooden screen, pierced with a continuous window; and the master should be so seated that he can command every part of it. It should be thoroughly well lighted by an external window, and be heated by hot-water pipes, so that wet coats may be dried. There should be two doors, both leading back into the class-room, and not into a corridor or the hall. Thus this annoying school offence may be made almost impossible. In this, as in all matters of discipline, prevention is better than cure.

The fourth trouble that a head master has to face is that, whatever pains he takes to get a good tone among his lads, some time or other he will admit a black sheep, and he will have indecent scribbling on the walls, or indecent writing passed about. The latter process is greatly facilitated by building plenty of corridors. To prevent the former,—scribbling on the walls,—all the internal walls of class-rooms, corridors, halls, &c., and, in particular, the slabs of the urinals and the closets should be lined with glazed bricks to the height of 7 ft. Moreover, the porter's-room must be placed near enough to the urinals for him easily to make frequent visits. And I should like these offices to have only low walls, so that they may be completely open to the view of each master who has a first-floor room on that side of the building on which these offices are situated. They need not be placed close to the main block, but they should be placed near enough to facilitate supervision as much as possible.

So much for difficulties of discipline. Now as to the health and efficiency of masters and pupils. If unhealthy arrangements prevail, and I find them almost universally unhealthy, not only in the English public schools, but even in the model schools of Germany, Scandinavia, and France (here also the École Monge is a brilliant exception), the efficiency of the school goes down to an enormous degree. I have hardly seen more than one or two schools where the boys do not look jaded and listless, pale or flushed, as the case may be, and restless and cross at the end of afternoon school; and the masters also, only more so. Again, my boys come back to school with clear skin, bright eyes, cheerful, full of work; the masters also; and for a time all goes merry as a marriage bell. Then the health standard declines, industry declines, friction increases, the teacher ceases to be bright and cheerful himself, the boys do not learn well, and the teacher does not teach well. We systematically lower the health of teachers and boys all round. At last the boy leaves school, and probably recovers. It is usually surprising to see what a splendid fellow, physically, your boy soon is when he has left school. The masters do not leave, and often become nervous, querulous dyspeptics. Now architects can raise the efficiency of our teachers at least 25 per cent., and the happiness and cheerfulness of masters and boys at least 50 per cent., if they will exterminate four evils. These are noise, gas fumes, dust, and foul air.

Of noise, one of the causes is my *bête-noire*, the corridor. Another is the planked floors. Wood blocks are much less noisy and more durable. But I should like to see some kind of noiseless asphalte laid down, not only in the corridors, but in the class-rooms and hall. It need not be cold to the feet, for to each desk would be fixed a foot-rail, so that the feet of each boy would be removed from the floor. The noisiest of all corridors is that paved with flags or stone; the tramp of feet along such a floor echoes all over a building.

Till we get the electric light, it is inexcusable for architects to poison us by inserting gaseliers which do not carry off fumes.

But a much worse enemy is dust. The way to introduce plenty of it is to build projecting mouldings and wide window-sills in the class-rooms; secondly, to have cupboards with a well at the top to hold dust; thirdly, to have a wooden floor, which can only be brushed, and may not be washed except when the vacations begin; fourthly, ceiling and walls, if whitewashed, will hold some dust; these, also, cannot be washed; lastly, the desks of boys and master may be so designed that the sweeping-brush cannot get beneath them; thus nest-eggs of dust are left. The ideal class-room would have an asphalte floor, with a rise in the centre, and gutters all round; there would be glazed bricks for the walls, at any rate half-way up; and the ceiling also would be distempered or so constructed as to wash. In the corner should be a hydrant, and floor, walls, and ceiling should be sluiced, not once in three months, as at present, but every night, in a third of the time that it takes to sweep the room. The extra cost of the water-pipes would be saved in the lessened daily cost of cleaning, to say nothing of the additional security against fire. I remember seeing the great dining-hall at the École Monge; it had just been vacated; the boys ate at little marble tables; a relay of servants carried off plates and dishes; the windows were thrown wide open; a mighty hydrant was opened, and a deluge was sent flying over tables, floor, and walls; and in a moment crusts, crumbs, smells, and foul air disappeared in one gush. The windows were closed, heat turned on, and soon the hall was ready for another batch of diners. No trouble is too much to take if only we can banish this great foe—dust.

But the worst of all these evils is foul air. This, more than anything else, ruins health and shortens lives. I never entered a school yet which was thoroughly well ventilated as well as warmed. The first thing to notice is that the problem of ventilation in summer is quite different from that of ventilation in winter; also that the problem is a much more difficult one if the rooms are not warmed by fires in open grates, but in some more artificial way that is less expensive in coal and labour. As to ventilation in summer, the extracting process differs little from that used in winter; except that in summer the outflow of vitiated air can only be assisted by heating with gas jets a main extractor flue of metal; whereas in winter we can accelerate it by using the waste heat of the chimney leading up from the fires and furnaces used to warm the building, as well as the gas fumes led up from the gaseliers in each room. In summer the real difficulty is not so much with the exits as with the inlets of fresh air. In the winter the difference of temperature between the air of the rooms and the outside air is usually considerable, and the air generally rushes up the "Tobin" tubes readily. But in summer the two temperatures differ much less, and much less air comes up the tubes. The only remedy I know is to have good cross-draughts, which, however, must be kept high up above the boys' heads. For this purpose, a large part of the head of each window should be made to open; and large shutters should be placed in the opposite wall at the top of it, swinging on a horizontal pin running through the centre of each. If both the shutters and the upper sashes of the windows are open, a good current of air can generally be produced into the corridor. It is, of course, essential the corridor itself shall have a good current of air passing through it.

In winter, the extracting-flues and the Tobin tubes usually work fairly well, when the tubes are properly constructed. Usually the external opening of the tube is masked by an ornamental grating, which diminishes the current of air by at least one-half. Why cannot this grating be omitted altogether?* Secondly, in many tubes I have found valves inserted. These are often jammed by rubbish which has fallen into the tube, and which cannot be cleaned out. There should be no valve at all, but just an ordinary box-lid at

* Because rubbish will be put down the tubes: see next sentence.—ED.

the top of the tube, which can be so made as to close either partially or wholly. It should be possible to clean out a Tobin tube as easily as one cleans one's pipe. Nor should cotton-wool or the like be placed in the tube to act as a dust-filter: it is soon stuffed up with dust, and no one remembers to remove it. It may be news to some that no air at all will pass through a Tobin tube if wire netting with fine meshes be placed over the top. I found six new tubes the other day all in this state: not a whiff of air passed up. The happy owner had been deluding himself for three months with the idea that his rooms were being ventilated. As soon as I put my fist through the wire gauze, a strong draught rushed up. For school purposes, a Tobin tube should be open to its full width at both ends, but may have a lid at the top.

Connected with ventilation is the subject of heating. Under no circumstances should the temperature of a class-room be allowed to rise above 60 deg., nor should it fall below 55 deg. The two systems of heating of which I have heard good accounts are Mr. Cunningham's mechanical or positive system, by which warm or cold air is driven by a machine in the basement through tubes to each room at any rate and any temperature desired. This would seem to solve the whole problem of ventilation as well as of heating, if extracting flues be added. But I have no information as to the initial cost and daily cost of such a system, or of its success. I believe that it was adopted at the High School, Dundee. The system I have to deal with is that of Perkins' hot-water pipes, in which an alkaline solution should be put to prevent freezing in the Christmas vacation. I am told that they ought to have been placed in coils inside the Tobin tubes. But if my Tobin tubes acted as exits instead of inlets, as they do sometimes, all the heat would pass into the open air instead of into the class-room. Perhaps this would not occur if we had extracting flues, which we have not. Another difficulty that occurs to me is that the current up the Tobin tubes varies greatly in strength. If it were freezing outside, and I had the lid of the tube wide open, the air would rush up the tube so fast that it would be heated but little in passing among the hot-water pipes coiled in the tube. On the other hand, if I partly closed the lid, little air would pass up into the room. In the former case I should have plenty of air entering into the class-room; but it would be air almost cold. In the latter case the air entering the room might be warm enough, but there would be little of it. Can any of your readers tell me of any school where the difficulties of ventilation and heating have been met successfully?

So much for the buildings from the point of view of health. I have spoken, too, from the point of view of the head-master. Now, what do the assistant masters want? In the first place, architects should remember that nowadays no school, even in England, uses the hall for teaching purposes, except under compulsion, and because there are not enough class-rooms. Doncaster and Bristol Grammar Schools are, I hope, the last schools that will be designed in England for the classes to be taught in one big hall, each interfering with the other. On the Continent, one often meets with schools, even of the first magnitude, without a hall at all. I would not go so far as that. Without a common place of assembly a school would seem rather a collection of separate schools than one corporate entity. And that is what the Continental gymnasiums and the rest really are. We want a hall in an English school, but as we do not want it for teaching, or even for examinations, it must be regarded, in comparison with the class-rooms, where the main work of the school goes on, as being an article *de luxe*. What money there is to spare, then, should be spent on the class-rooms, and not on the hall. The uses of the hall are, or might be, these—(1) for prayers; (2) for the head-master to address a levy of the whole school on matters affecting the school as a whole. These two are the only two objects for which the hall is essential; all the rest are subsidiary. (3) It may be used as a play-room in bad weather; but covered sheds in the fresh air of the playground are better. (4) It may be used as a gymnasium, one half being reserved for classes with dumb-bells and Indian clubs, the other covered with gymnastic apparatus. If so, the latter should be so constructed that part of it, *e.g.*, ropes and poles, can be raised overhead when not in use, as in the Central Gymnasium, Stockholm, while the rest, such as the bars, should sink beneath the floor, as in some other of the Stockholm schools. But gymnastics kick up a great dust, and moreover ought to be performed in fresh air, therefore it is better to have a separate gymnasium in the playground. However, if one has no gymnasium, but a large hall, it is well to turn the hall to account for gymnastics. (5) A great hall is *not* necessary for prize days. The hall need not be constructed so vast as to accommodate a crowd of outsiders who only come once or twice a year, perhaps. It is really too great a waste of capital. Much better to have the prize distribution and speech-day in the Town-hall, connecting the school, as it should be, more closely with municipal life. Therefore, the hall need not be larger than will accommodate the pupils, with perhaps a margin for 200 spectators at some school theatricals or house-concert. (6) Nor is the hall indispensable for examinations. It is better to have two or three sets of double class-rooms for this purpose, so arranged that each pair can be thrown into one. Supervision also is easier in such a room; and there is greater quiet than in a large hall. (7) The last use of a hall, and a very good use it is in my opinion, is to use it as a passage-room for all the class-rooms. But the class-rooms should open direct into it, and not into intervening corridors. I can conceive of no greater happiness for a disciplinarian, than to be able, from his own room, to see every boy who enters or leaves a class-room. That is what the central hall comes to. There should be a continuous window, about 5 ft. from the ground, running along the side of the class-room which is next to the hall, so that the head-master, as he goes round, can see the state of discipline in each room, without entering the room and disturbing the class in its work. Not that he wants to play the spy on his staff, but that he may see easily what are the classes where his assistance and presence is required by a weak disciplinarian or by some master newly appointed and in need of help. If the school is very large, the hall will need galleries, and may be surrounded by class-rooms, two stories high on all four sides. Or the class-rooms may be placed on three sides only, and on the fourth side may be placed rooms, of one story only, for the head-master, secretary, &c.; what I have called above the administrative block. A space may be reserved in the centre of the hall for assembly of the whole school at daily prayers, &c.; this may be marked off by wooden removable screens. These should be about 4 ft. high; thus, boys when seated in this central area would be unable to see any boys passing from room to room; in this way the central space might be utilised for examinations, if thought necessary. On the other hand, these low screens would not hinder the head-master or discipline-master from having an uninterrupted view of every part of the hall up to the class-room doors. I suppose that the stairs also leading to the gallery might descend into the hall, so as to be well in view.

To return to the assistant-masters and their class-rooms. There may be two or three small rooms, and certainly two pairs of double class-rooms, not only in order that these latter, when thrown together, may be used for examinations, but that every master, while new to the school, may be put at one end of a double room of which the discipline may be at first entrusted to an older and more experienced member of the staff at the other end. When the new man has got his footing the movable partition may be closed, and he may be left to his independence. Double rooms are also useful for choir-work and art teaching, and a pair of class-rooms in the upper story should be specially designed and lighted for the latter purpose. Also two or three sound-proof piano-boxes or piano-rooms are usually necessary; they are better outside the building. The ordinary class-room should be at least 30 ft. long, 20 ft. broad, 16 ft. high. Three of my own class-rooms are 40 ft. long for classes of thirty boys, and we find it an enormous advantage to have the desks at one end of these oblong rooms and an open space at the other end; at this latter we seat the boys whenever any lesson is given where pens and ink are not required. At this end of the room we can have place taking, which greatly enlivens the work of a class of small boys. Moreover, the boys get change of position. I pitied the German boys, chained to one desk all day. And ventilation is aided greatly; *e.g.*, in summer, when the class is seated at the desks, the windows at the other end of the room are always open, and *vice versâ*. If the desks are arranged in this fashion, and if dual desks are employed, 20 ft. is not quite sufficient breadth for the room. All cupboards should be carried up to the ceiling, so as not to hold dust. In every school I have seen abroad lately, the light is made to fall from behind over the boys' left shoulders; cross-lighting also is avoided. If the annual fee for tuition exceeds 10*l.*, there should not be more than thirty boys in each class; if the fee is lower, not more than forty. The windows should be carried high up, the panes should be of clear class, and the amount of window-space should be large. There should be one main entrance to the room, besides two doors into the cloak-room attached to it.

I have spoken above of the floors, ceiling and walls. There should be a blackboard on wheels, even if a continuous blackboard runs all round the four walls. I think that the assistant-master would now be a happy man. I should add that it is most important to provide abundance of urinals and closets, far better to have too many than too few, scarcity of accommodation leads to the most serious trouble if boys are waiting about for their turn and conversing. It is as well to speak plainly about these things. It is also desirable to provide kitchens and a dining-hall in a large day-school. Many pupils may come from a distant part of the town, and a large number may come in by train from the surrounding towns and villages. Nothing can be worse for the morals of the school than for these boys to frequent public-houses for a sausage and glass of beer at 3d., as they often will, in order to have some dinner-money left to be spent on other purposes. Nor is it advisable to let them loaf about in the streets and add to their education there.

Of the schools of the type which I incline to, those with the hall-passage, the following is a list more or less correct. I hope that any errors in the list may be corrected, and additions made to it. Mr. Robson's Board school at Haverstock-hill, and the Blackheath school for girls; Mr. T. Roger Smith's Board school in Johnson-street, Stepney; Mr. Robins's school in Camden-town; Mr. Clutton's day-school in Liverpool; St. Francis Xavier's College; Lancing College; the Salt schools at Saltaire; a new Board school at Leeds; and the École Monge, Paris. Useful remarks upon the hall-passage plan, as well as articles on ventilation and heating, will be found in Sonnenschein's new "Cyclopædia of Education."

I will conclude with a few particulars about the best day-school I have seen,—the new "Real-schule" at Gothenburg, built for 700 day-boys, and already nearly full. The town contains only 90,000 people, and there are actually two more high schools for boys, each of them with 700 boys. What a contrast to England! The total cost of the "Real-schule" comes out at 40*l.* per head. This includes the buildings, heating and ventilating apparatus, desks and fittings, and gas, water, and electric fittings. Externally, like all the Swedish high schools, the building is plain, but it is imposing from its height and mass, and it has the merit of telling its story,—you see at once that it is a school. It con-

sists of three stories above a basement. The reason why it comes out so expensive is,—first, the vast corridors; second, the immense hall at the back, a much finer room than many town halls; thirdly, the great number of rooms in excess of those used for the actual task of teaching. Out of forty-seven rooms only twenty-two are class-rooms, the remaining twenty-five being devoted to such purposes as laboratory work, lecture theatres, store-rooms, &c. In Stockholm also great high schools are being built at even greater cost, varying from 55*l.* to 65*l.* per head. Each has a large separate gymnasium. I found the cost of installing a large gymnasium for 600 boys to be about 275*l.* Gymnastics seemed to be elaborated in Sweden more than anywhere else. F. B.

P.S.—Since this paper was written I have obtained a pamphlet by Sir Henry Roscoe, published by Danks, in which he demonstrates the astonishing foulness of the air of schools, and gives his preference to a mechanical system of ventilation, with particulars as to its initial and daily cost.*

NOTES.

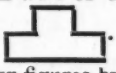
IN the course of Mr. Lambert's examination before the Board of Trade a few days ago, the Great Western Manager alluded to the constantly-increasing expense incurred by the Company in fulfilling the requirements of the Board in order to secure greater safety in the working. It is undeniable that a large expenditure is due to this cause, and not to any increase of traffic; and quite as true that such expenditure does not enable railway companies to work the traffic more economically or with greater speed. But the additional increase of safety brings with it a corresponding reduction in the amount paid by way of compensation for injury to life and property, and Mr. Courtenay Boyle promptly directed attention to this view of the matter. The measures of precaution which the Board have insisted upon have been called for by frequently-recurring disasters, and the adoption of such measures brings its own reward. An allusion was also made to the Railway Bills of 1885, which, it will be recollected, were petitioned against by all sections of the community, and ultimately abandoned. Mr. Lambert's explanation of this is that the Bills were not supported by the Board of Trade as the companies were led to believe they would have been. This is instructive, for the attitude of the Department,—and, indeed, of the Government,—towards these much-abused measures was the subject of a considerable amount of speculation at the time. The selecting of stations for working out the terminal expenses seems to grow more and more complicated. The London and North-Western Company, as we have already remarked, submitted sixteen, the associated companies are prepared with details of a further 101, while the traders have put in a list of forty-four more places with regard to which similar information is demanded. It is to be hoped that this part of the case will be narrowed down very considerably before the inquiry is re-opened next week. The able Secretary of the Railway Companies' Association (Mr. Oakley, of the Great Northern Railway) will probably be the next witness.

THE promoters of the Central London Railway Bill have issued a statement for the popular mind, to do away with the misapprehension which they say exists on the part of the public in regard to this scheme; and certainly if it is true that a leading London paper described it as a scheme for running an electric railway along the surface of the most crowded streets, the promoters have some reason to complain of "misapprehension." The following are the main points of the statement:—

"The Central London Railway is proposed to start at Queen's-road, Bayswater, to pass under Bayswater-road, Oxford-street, Holborn, Newgate-street, Cheapside, and King William-street, and to terminate near the eastern end of King William-street by a junction with the recently-constructed City and Southwark Subway. . . . . The mode of construction proposed to be adopted in the case of this railway (except as regards the stations) is practically the same as that used in the City and Southwark Subway. There will be two iron tubes, or tunnels, of about 11 ft. internal diameter. One will be used for the up traffic, the other for the down traffic. A steel shield with a cutting edge will be forced by powerful hydraulic pressure into the clay in advance of the excavation, so as to obviate the slightest risk of movement in the ground over or near to the tunnels. The iron tunnel as it is placed in position will be grouted with blue lias lime in a semi-liquid state, which, when it sets, becomes virtually stone, and the result is an iron tunnel encased in stone, the strength and durability of which will be enormous. The same system of construction will be adopted for the stations, which will be of iron, instead of brickwork as in the City and Southwark Subway. In order to drive these tunnels the sites of the proposed stations will be first acquired, and shafts will be sunk on the private property so acquired, and not in the streets. The spoil will be brought to the surface by these shafts, and the material for constructing the railway will be passed down through them. The work can be carried on simultaneously in both directions from all the station sites. In the construction of the railway there will be no interference with the surface of the streets, and consequently no stoppage of the traffic."

This seems to render it evident that the railway can be constructed without material interference with street traffic. Whether the game is worth the candle, and whether the proposed means of transit will be as popular as the promoters profess to believe, is another question. Travelling in a tube 50 feet under the ground is not an attractive idea; and while the pamphlet states that "perfect ventilation will be maintained" it does not go into any particulars as to the means to be adopted to ensure this. An extract fan would be necessary for each section of the line between stations, unquestionably.

WE learn that out of the first competition for New York Cathedral the designs of four architects or architectural firms have been selected, the authors of which are to compete a second time. They are Messrs. Potter & Robertson, Mr. W. Halsey Wood, Messrs. Heins & La Farge, and Mr. G. Martin Huss. The first-named architects are well known for good Romanesque work; and it is also known that Mr. Potter is the bishop's brother. The other three are not well known in regard to church architecture, and some of those who had considerable reputation in this respect, names certainly much better known on this side of the water, have been left outside. Nothing can however be done for a long time, as the 1892 Exhibition is to be held on the site ultimately to be appropriated to the cathedral.

THE *Berliner Philologische Wochenschrift* for December 21 gives a good summary of the most important of the archæological discoveries of 1889, among which, the discovery of the temple of Despoina, in Arcadia, to which we drew attention some weeks ago, naturally holds the first place. The temple, it will be remembered, was found on the north side of the ridge known as Τερφῆ, about 100 mètres to the west of the ruins of a chapel of S. Athanasios. The ground-plan has been clearly made out, and proves to be that of a Doric hexastyle prostyl temple. The orientation of the building is east and west. It is twenty mètres long by ten broad, the cella is thirteen mètres long. The portico, which fronts the entrance, is of marble; the walls of the cella have their lower courses of masonry of local stone, the upper of unburnt brick. The portico appears to have been crowded with votive offerings, of which the bases are fortunately still extant. Dedications to Despoina are frequent, and some of the tiles are inscribed Δεσποινας, "of Despoina." Happily, therefore, there is no shadow of a doubt as to the name of the temple. Near to the back wall of the cella is a large base, shaped  . Here it is supposed stood the four figures by Damophon, which Pausanias describes (viii. 37, 3), and to which we have already called attention. The actual sculptural fragments discovery, which Mr. Kabbadias conjectures (and the conjecture amounts almost to certainty), belong to this group, are as follows:—A colossal female torso, three colossal female heads, various other fragments, among them a hand with the stump of a torch, another with a lamp, a third holding a piece of a snake; fragments of the feet of a marble chair, four female figures, the lower parts of which branch out into two snake-tails. These last are all the same height (0·23 m), and stand in the same attitude, with one hand raised; they each hold a round object, on which something else, presumably the side supports of a chair, rested. We can only repeat that, as these are the first and only fragments we possess from the hand of the famous Damophon, they are of signal importance, and we hope their publication may not be long delayed.

IN building the new railway-station of Trastevere, at Rome, some ancient Roman tufa quarries, with long and wide galleries, have been discovered in the east side of the hill of Monteverde, and in cutting through the rock a new road leading to the railway-station, a quadrangular niche was found in the tufa; this niche has a pediment, on which is sculptured in bas-relief a club between two vases. In the cornice the following inscription is cut:—

L · DOMITIUS · PERMISSUS.
FECIT ·

The bottom of the niche having been carefully cleared of earth, sculptures and other objects were found, which showed it to be a little shrine sacred to Hercules. The excavations were continued to a depth of 5 mètres, when the altar was found in its place, standing on two steps built of brick, and before it were two pedestals, 0·75 m. high and 0·50 m. wide, each of which bore the following inscription:—

IMPERIO
HERCVLI · SACRVM
L · DOMITIVS
PERMISSVS

On the front part of the altar traces of stucco bas-reliefs are to be seen, but as a great part of the stucco has fallen off, they can hardly be made out; they apparently represented a dance. The inside of the niche is covered with red plaster, and various ornaments, such as birds and flowers, are painted on a yellow field. The objects found in the shrine are four tufa statuettes, representing Hercules, a marble head of Bacchus, another of Jupiter, a bust of Minerva, and other fragments of marble and tufa statues. The excavations were continued around the shrine, and resulted in the discovery of various marble slabs, used for paving the temple or for covering its walls, and of the following pieces of sculpture:—Bust of a bearded adult; bust of a young man, with a light beard and thick hair; bust of a beardless youth, very well preserved; bust of a man strikingly resembling to the Emperor Trajan. These busts were placed on a base of variegated marble. Two fragments of Ionic capitals, a few terra-cotta lamps, and a great many bronze coins of Augustus and of Antoninus Pius, were also found.

IN the Prati dei Castelli of Rome, where the Palace of Justice is now being built, two large sarcophagi of marble have been dug out. One of these is 2 mètres in length, and 0·65 mètres in breadth. It is ornamented with two bas-reliefs representing winged *genii* occupied in picking grapes. On the front part of the sarcophagus is the bust of the defunct, who holds a book in her left hand. The sculpture and the manner in which the hair is arranged lead to the belief that the sarcophagus belongs to the second

* There can be no kind of question that mechanical ventilation, when it can be afforded, is the most efficient and the most certain in all seasons, for schools and other public buildings; an opinion we have frequently expressed.—ED.

half of the third century after Christ. Under the bust two masks of Bacchus are sculptured. On all the front part of the sarcophagus traces are still to be seen of ancient gilding. The style belongs to the epoch of decline in art. The other sarcophagus, of great size, is entirely made of unpolished marble, and its lid is a slab of marble which had already been used for some other purpose.

ON the Capitoline Hill, where important works for the erection of a monument to Victor Emanuel are going on, part of the fortifications belonging to the Arx or citadel have been discovered a few mètres from the spot where the other ruins had already been found. (See *Builder*, 1889.) The newly discovered remains comprise four rows of large tufa blocks, perfectly square. Near this ancient building, in a subterranean chamber above which Paul III.'s (1534-1549) tower, demolished two years ago, originally rose, the skeleton of a man has been found on the bare earth, with two great mediæval swords crossed on his breast.

EXCAVATIONS are now in progress in the area occupied in ancient times by the Imperial villa built by Nero (see *Builder*, July 13, 1889, pp. 21-23). Some rooms built of large bricks, covered with stucco of excellent workmanship, and with pavements of mosaic representing ornaments and different animals, have been found. In one room a fine statue of Venus of white marble was still preserved in its place. Of this we will give an illustration shortly.

THE City of Chicago seems to have been holding high festival over the opening of a music hall and theatre (or "theater," as they call it in the new American language) of no ordinary splendour and proportions. To judge from the language of the Chicago newspapers, indeed, one would think that Paradise had been opened to the citizens, but the illustrated supplement of the *Daily Inter-Ocean*, published in honour of the event, shows that a rather remarkable building has been erected, as far at least as its interior arrangement and design are concerned. Externally the building has the likeness of a monster hotel of rather heavy and ungainly design, and with nothing in its architectural treatment to indicate the nature of the interior which is enclosed behind this outer mask of hotel rooms. The paper above referred to publishes a section, which enables us to see how the large theatre is arranged within this outer rampart of chambers, which rises all round high above the roof of the theatre. The section as published does not, however, indicate how the interior is lighted. The property-rooms appear to form a solid block over the greater part of the auditorium, an arrangement which would not be approved of in this country. The arrangement of the seating as shown in the section ought to be very good for enabling a large number to see and hear well. There is an immense pit or "parquette" extending in a very gradual rise from the orchestra bar to the back of the house. The orchestra is sunk, on the principle which Wagner was mainly instrumental in starting, between the audience and the stage, in a gallery with a concave floor, we presume for the purpose of reinforcing the sound. One of the special constructive features is that a coved ceiling to the upper circle, having the cove facing towards the audience, is capable of being turned round on its lower edge and dropped to form a cove towards the house and shutting out the upper circle, thus rendering the house smaller if desired: the cove is designed, we are informed, so as to fit into the architectural design in either situation. This is a new idea worth noting. From some sketches of bits of the interior given in the *Inter-Ocean* it would appear that the architects (Messrs. Adler and Sullivan) have developed a certain amount of originality in the treatment of detail. An organ is placed adjoining the proscenium arch, and flanking the end of the orchestra chamber; but apparently masked behind a decorative screen. It furnished an important addition to the opening proceedings, however, the ceremony being opened by a Triumphal Fantasia for organ and orchestra composed for the occasion by M. Dubois, a French organist and composer. The building is intended, we gather, for either musical or dramatic performances as desired. No scale is appended to the section, but taking the general heights of boxes, &c., as affording a rough scale, it would seem that the house must be too large for anything but spectacular drama. However, it is evidently a building worth attention, though we wish the exterior architecture had more to recommend it. "The Auditorium" is the name by which the building will be known.

A PROTEST has just been made by a number of Stockholm architects against recent jury decisions, the step being due chiefly to the result of the recent competition in respect of the new Houses of Parliament and Treasury Buildings to be built in Stockholm, to which we have referred on several occasions, and which caused a keen competition, some 120 designs having been sent in. Two of the competitors, Messrs. Ulrich and Melander, some time back lodged a protest on their own behalf against the decision, but no steps were taken by the authorities in the matter. Now, however, a protest has been drawn up, signed by fourteen leading Stockholm architects, in which the step taken by their two colleagues is fully approved, the chief ground of complaint being that the juries in architectural competitions, when judging the plans sent for competition, do not adhere to the principal conditions laid down in the programme, whereby those competitors suffer who have followed these conditions most strictly. The protesting architects, therefore, demand a strict adherence to the conditions of the programme in architectural competitions. This protest is signed by such leading Swedish architects as Messrs. Clason (designer of the new National Museum), Ekholm, Holmgren (architect of the new Upsala Museum), Lindegren, &c.

THE Secretary of the London Electric Supply Corporation publishes a significant letter in the *Times* of Thursday containing a quotation from Mr. Musgrave Heaphy's report on the causes of the fire at 8, Grosvenor-square, which arose from the electric lighting installation. Mr. Heaphy's report said:—

"I have made an examination of this installation of Mr. Amherst, at 8, Grosvenor-square, as far as it was possible under the circumstances. I found the work in the house was certainly not in accordance with any fire-insurance rules with which I am acquainted, nor with the specification of the London Electric Supply Corporation. The conductors were in contact under the floors, they were unencased, and fastened by metal staples. Among the few places that I was able to examine, I found that a staple had cut into the insulation. The conductors in another place were in contact with the bell wires."

It was at a date subsequent to this evidently most careless piece of work that the Electric Supply Corporation very rightly determined to refuse to supply their current into any buildings until, by inspection, they had first satisfied themselves that the work had been properly done and in accordance with their specification. They added that had they known of the facts now brought out by Mr. Heaphy's inspection, they would never have connected the installation at 8, Grosvenor-square to their mains, as with work done in the way that was, "a fire sooner or later was inevitable." This is an important lesson to private owners to be very careful whom they employ to fit up electric lighting in their houses. If all the companies which have concessions to supply London districts adopt the same course which the Electric Supply Corporation have taken, and refuse to connect with any residence until a competent electrical engineer has made a satisfactory report upon the fittings, the danger to private owners from their own carelessness will at all events be minimised.

THE serious accident on the Chesapeake and Ohio Railway, near White Sulphur Springs, is said to have been occasioned by "the spreading of the rails" while a train was going at high speed to make up for lost time. This, we presume, is one of the results of the American expeditious system of laying down railways in an incredibly short space of time, of which we hear every now and then. It is not an accomplishment to be very proud of. English railways occupy more time in construction, but the rails do not burst open under high speeds when they are once down.

SHORTLY after the death of Dr. William Chambers, the restorer of St. Giles's Cathedral, Edinburgh, it was resolved to erect a monument to his honour. The question was raised as to the shape which the memorial should take. One proposal was that a built-up chapel, to the east of the north transept, which had been used as the Session-house of the High Church, should be thrown open, put in proper order, and a monument with a recumbent figure of the deceased placed therein; another proposal was that a bronze portrait statue should be placed upon a suitable pedestal in an appropriate site in the open-air. The latter course was adopted, and Mr. Birnie Rhind, sculptor, was entrusted with the commission; the site fixed upon being in Chambers-street, immediately opposite the Museum of Science and Art. The question as to restoring the closed-up chapel has again cropped up, and it has been resolved that it should be converted into a memorial chapel to Dr. Chambers, with a stained-glass memorial-window therein. There will thus be five chapels attached to the cathedral, two on the south side and three on the north. The two former, comprising the Moray chapel and the Montrose chapel, are sufficiently supplied with appropriate monuments, but the three latter are empty. It would greatly add to the attraction of the cathedral, and give it an air of greater completeness, were these chapels furnished with canopied tombs; and there seems no reason why the appropriation of one of them as a memorial to Dr. Chambers should exclude from it any appropriate memorial to another. The walls of the aisles have, since the restoration, received numerous memorial-tablets, principally brasses, and care seems to have been taken that these should not be incongruous with the surroundings, and one of the best of these has been placed in the Montrose chapel beside the fine monument recently placed there, which was designed by Dr. Rowand Anderson.

THE Tudor Exhibition at the New Gallery has a higher interest than the Stuart Exhibition of last year, inasmuch as one of the principal figures among the Tudor Sovereigns, Henry VIII., as well as a good many of his subjects, had the good fortune to be painted by a great artist, whose works are now, by the irony of fate, of more value for his own name attached to them than for the names of the eminent persons of the day whose portraits he painted. The Holbein portraits of Henry VIII. are numerous in the West Gallery; none perhaps so interesting and characteristic as the unfinished cartoon (42) representing Henry VIII. standing with his legs apart and with that kind of general look of a bully which was an essential part of his character. Among other Holbeins may be especially mentioned the portrait of himself (52), the "portrait of a man" (67), belonging to Sir John Millais, and before seen in the Burlington House loan exhibitions, the magnificent full-length of the "Duchess of Milan" (92), one of the finest female portraits ever painted; and the "Sir John Moore" (100). These, and the artist's small studies of heads and figures, are alone worth a visit to the exhibition. The Queen Elizabeth set of pictures in the North Gallery are of less interest, because Queen Elizabeth had no Holbein, nothing better than Zucchero, to paint her. The portraits of her vary very much in physiognomy, and only one or two make her

really handsome; but the horribly-constructed ladies' dress of the period was enough to destroy any degree of natural charm. There is a fine collection of armour in the hall, and the cases in the rooms contain some objects of decorative art of great beauty and interest, in particular some of the cups in the case in the centre of the West Room. The cup belonging to Corpus Christi College (812), and that given by Henry VIII. to the "Barber-Surgeons" Company (814) are beautiful work. Some of the decorative work and armour we shall give illustrations of shortly.

PAPERS have been read at the recent meetings of the Northern Architectural Association at Newcastle by Mr. W. H. Dunn and Mr. J. H. Morton, on the subject of "Architects as Scientists," the latter gentleman's paper being apparently a reply to the former one, in which Mr. Dunn urged that the scientific and technical side of architectural practice should be more developed and attended to by the architect, who should be the chief workman. "The chisel, the hammer, and the plane would have to enter largely into the work of their young men if they were to keep the position of the architects in the nineteenth century." So far as this is possible it is no doubt advisable; but one man and one lifetime are not sufficient for everything, and we fear the fumes of chemistry may have a tendency to clog the brain of the designer. Architecture has been too much mere design, or even mere drawing; now there is evidence of a reaction in which design in the proper sense may be snuffed out. The practical reactionists are in danger of forgetting that, after all, the intellectual interest of the architecture of the past is mainly in its design; in its outside quality. Turn over such a *résumé* of the subject as is given in Fergusson's history, and it must be evident that what makes the subject worth a great book on it, with hundreds of illustrations, is the various forms of architectural design and expression employed in different times and in different countries. The practical construction employed, though indissolubly connected with the subject of design, is not that side of architecture which has rendered the subject perennially interesting to educated minds of all times. It is the design and artistic element of the architectural monuments of Athens and Rome, Florence and Venice, that renders them sacred shrines; it is not the construction which draws us to look at them, interesting though this is as the basis of the design. The *Newcastle Daily Chronicle*, in a generally sensibly-written leader on the subject of the two papers, unconsciously points to one of the most apt illustrations of the danger to architecture from the artisan side of the study being developed at the expense of the architectural, viz.: the Scott Monument of Edinburgh. This is an old example often quoted before, of what the studious artisan can accomplish. It is so in more senses than many people are aware of: it is a very clever and ambitious design, as a whole, for a self-trained artisan to have produced; but the detail is coarse and bad to a degree, and has been a source of annoyance to thousands of those whose eyes are trained to know what good detail means. It is in detail that the hand of the really cultured and artistic architect, and the difference between him and the artisan, is especially shown. Many people could rough out a general sketch of a powerful design, who would ruin their own work when they came to detail it: and they will never learn refinement in detail from practising with "chisel and plane" and "the fumes of chemistry."

The Potsdam Mausoleum.—The work on the mausoleum now being built at Potsdam, which is to contain the remains of the late Emperor Frederick, is actively progressing, and it will be finished in the Spring. The interior of the cupola is to be lined with Italian mosaic, manufactured in Venice.

LETTER FROM PARIS.

FOR some days the world of art in Paris has been disturbed over a conflict that has arisen within the Société des Artistes Français, and which may lead to serious results in regard to the future existence of that body. This is no less than a proposition for the formation of a new society apart from the existing Society, and having its own annual exhibition, and admitting into its regulations neither "exemptions" nor rewards. If this movement is accomplished,—and latest advices speak of it as certain,—the new Salon will have at its head, besides M. Meissonier, all the masters of the younger school, MM. Puvis de Chavannes, Roll, Gervex, Carolus Duran, Dagnan-Bouveret, and Besnard, among painters, M. Dalou among sculptors, and among engravers MM. Bracquamard, Waltner and Pannemáker. This will be a very dangerous rival to the old society, which has been led by MM. Bouguereau and Tony Robert-Fleury on a course that seems very ill-advised and impolitic.

What has happened is this. In regard to the recompenses decreed by the International Jury of the Exhibition, a certain number of artists, discontented no doubt with the results of the awards, proposed that they should be disregarded and should not figure in the book of the annual Salon. Naturally, M. Meissonier, in his position as President of the Jury of Fine Arts, energetically combatted this proposition, which is absolutely contrary to established usage. It may be as well to add that M. Bouguereau figures in all the Salon books with the detailed list of honours he has received in the previous universal exhibitions of 1855, 1867, and 1878. M. Meissonier, at a very stormy meeting, endeavoured to convince the artists that they could not now take a step that would diminish the value of the awards given in the most recent of these exhibitions. His efforts were in vain, the coteries of the ateliers prevailed over his reasoning, and M. Bouguereau's proposition was adopted by a large majority of votes. M. Meissonier has accordingly withdrawn from the Société, followed in his retreat by a great number of artists, who have signed a strong protest against what they consider as an absolute want of courtesy not only towards the French Government but towards foreign artists. What will be the precise result, and whether the new society will endeavour to retain a hold on the Palais d'Industrie, or seek a footing in M. Formigé's new building on the Champ de Mars, cannot be predicted at the moment. Possibly the State, which has been directly insulted by the existing Société, will feel itself at liberty to withdraw the use of the Palais d'Industrie, and hand it over to the recalcitrants. Whatever the result, the action of the existing Société is in very bad taste, and much to be regretted.

While there is this dissension among the artists of the sterner sex, it is a curious coincidence that the society of lady artists, "Union des Femmes Peintres et Sculpteurs," seems in a way to be more prosperous than it has previously been. It is directed by a very able sculptor, Madame Léon Bertaux, and does not quarrel about awards, but is devoting itself seriously to the artistic education of women; and in consequence of its efforts there is talk of creating presently at the École des Beaux-Arts a special course of sculpture and painting for women, and admitting them to compete for the Prix de Rome, &c. This feminine emancipation in art has already produced appreciable results, for in the Universal Exhibition the Fine-Art Section counted ninety-two lady artists who received medals, among whom fifty-one were Frenchwomen. Twenty-three members of the "Union des Femmes" were among the awarded, of whom seventeen were French and six foreigners; and of the four gold medals awarded to lady artists, two were given to members of the "Union," Mdmes. Demont-Breton and Léon Bertaux.

Nothing has yet been positively decided as to the treatment of the various exhibition buildings, though it is high time it were, if the Champ de Mars is to be got into order within a reasonable period. Its present aspect, in the dull December weather, with its half-dismantled porticoes and galleries, is melancholy in the extreme.

The two large palaces of Beaux-Arts and Arts Libéraux are now nearly empty, and the Cairo street is dismantled. Here and there heavily-laden waggons circulate amid the mass of *débris*. All the buildings on the quays are gone, but on the Esplanade des Invalides most of the structures are still standing. The footbridges which connected the various parts of the Exhibition have been removed; that over the end of the Pont d'Alma, which formed a kind of triumphal arch over that approach to the Exhibition, is to be re-erected at Calais, at the new central station of the Chemin de Fer du Nord.

Various new monuments or works of art have been inaugurated during the past month. The first to be noted is that of the two decorative groups in bronze placed at the entry of the abattoirs of La Villette. These groups, which during the Exhibition were erected on the Champ de Mars, opposite the Ville de Paris pavilions, represent the one "Pâturage," and the other "Abatage des Bestiaux," and are the work of M. Albert Lefeuvre and M. Lefèvre Destouchamps. Then came the opening of the new Mairie of Suresnes, designed by M. Bréasson, who has done well with the conditions and the site assigned to him. The new building has a façade towards the Seine with a large central pavilion, containing the Salle des Fêtes, flanked to right and left by the lower pavilions, containing respectively the Salle du Mariage and that of the Conseil Municipal. Internally a large vestibule paved with mosaic and decorated with marble columns gives access to the rooms of the principal story, by a fine double staircase with a wrought-iron balustrade. On the ground-floor a circular gallery communicates with all the administrative offices.

On the hill of Montmartre there has also been opened the large reservoir intended to supply the higher grounds on the right bank. This reservoir, which is to contain 6,200 cubic mètres of spring water, and 4,800 mètres of Seine water, is the work of Engineer-in-Chief Beehmann. The façade has been built after the designs of the architect M. Diet, adjoining the Church of the Sacré Cœur. Speaking of this church, we may observe that M. Abadie's fine building is now freed from its exterior scaffolding. The work of the vaulting is now being actively carried on, and the church will probably be covered in by the end of this year. The formal opening of the building is fixed for the end of the year. The mass of the building has now a very striking effect at the crown of the hill on which it stands. The cost up to the present date has been 22 million francs.

Various new monuments are in course of execution. M. Dalou has completed the model of the statue to be erected, by public subscription, to the memory of Victor Noir, the young journalist who was killed in 1870 in a duel with Prince Pierre Buonaparte, and whose death was the beginning of the public excitement that led to the fall of the Empire. The statue, of life size, will be executed in bronze by the *cire perdue* process. The artist has represented Victor Noir at the moment when he was about to fall from his mortal wound. The head is very expressive, and the attitude natural. The work, when completed, will be placed in one of the Parisian cemeteries, either Montmartre or Père Lachaise.

M. Crank, on his part, has commenced for the town of Lille the monument to be raised there, also by public subscription, to her great citizen General Faidherbe. The close of the year is announced for the inauguration of this monument, which is surmounted by a figure of Faidherbe and flanked at the four corners by figures representing the constituent elements of the old "Armie du Nord,"—an infantry soldier, a sailor, a dragoon, and a member of the national "Garde Mobilisé."

Lastly, M. Tony Noël has completed for the town of Versailles a very fine statue of the sculptor Houdon, who was born in that town in 1741. The pedestal for the statute is the design of M. Favier, architect.

M. Louis Dumoulin, a young artist who became known some years ago for a series of pretty views of Paris, is exhibiting at the Galeries George's Petit a hundred pictures and studies brought from Japan and China, where he was sent by M. Castagnary, then director of Fine Arts. The exhibition is the result of a two years' sojourn in the far east, scenes from which are illustrated with evident attention to nature and not in the spirit of conventional illustration. Nevertheless, the artist's earlier manner was better on the whole, and perhaps he will return to it now that he has come back to his native country.

The Société Centrale des Architectes has just constituted its new Council as follows: M.

Charles Garnier, president; MM. Alfred Normand and E. de Joly, vice-presidents; M. Loviot and M. Roux, principal secretaries; M. Boileau, editing secretary; M. Heret, archiviste; M. Bartaumieux, treasurer; MM. Bailly, Hermant, and Daumet, "censeurs."

At the École des Beaux-Arts the awards have been given for the exercises in the History of Architecture executed by the pupils of the second class. Medals have been awarded to M. Guimard, pupil of MM. Raulin and Genuys; MM. Labouret and Perkins, pupils of MM. Daumet and Girault; MM. Beauvois and Francon, pupils of M. André; M. Debat, pupil of M. Pascal; and M. Parize, pupil of M. Ginain. Twenty-nine "mentions" were awarded.

The French architects who are competing for the Achille Leclère prize, which is to be decided on March 1, have been given as a subject, "An arena for bull-fights." In a programme chosen by the French Academy for French artists, a "plaza de toros" was certainly unexpected. It seems to be a last reminiscence of the exhibition time, when a futile attempt was made to introduce into Paris this pastime, little in accordance with French taste and feeling.

The epidemic of influenza which has for two or three weeks caused us much anxiety has been the cause among other things of the death of the painter Jules Garnier, an artist of much talent, of a peculiarly Parisian cast. In his short career he unfortunately wasted fine talents and a great facility in composition on subjects of more than doubtful taste, which brought him a popular renown through the reproduction of photographs and engravings of such works as the "Droit du Seigneur," "Borgia S'Amuse," &c. He was also the author of a well-known picture entitled "Le Libérateur du Territoire," representing Thiers amid the acclamations of the Assembly of Versailles. He produced also the drawings for a series of engravings for an edition of the "Contes de la Reine de Navarre," and some very clever illustrations to a book which appeared lately under the title of "Jeux du Cirque." Few painters had a better knowledge of the types and costumes of the sixteenth century, and he had composed a series of 160 illustrations for the "Life of Rabelais," which are now to be seen in the galleries of the Boulevard de Madeleine.

Another artist, William Wyld, who had a certain degree of celebrity under the Second Empire, died a few days since, aged eighty, at his atelier in the Rue Blanche. Wyld was born in London, but had passed more than fifty years of his life in France. He obtained a troisième médaille in 1839, and a deuxième in 1841, and the cross of the Legion of Honour at the Exhibition of 1855. He had been a pupil and intimate friend of Bonington; later he became the travelling companion of Horace Vernet, with whom he went to Rome and to Algiers. He was mainly instrumental in introducing into France the taste for water-colour painting. The Luxembourg Museum possesses two of his pictures, one of them a very fine view of Mont St. Michel from Avranches.

THE ENGLISH IRON TRADE IN 1889.

IT would be difficult to point to any year in which the conditions of improved trading were of such a generally satisfactory nature, both to manufacturers and their workmen, as during the twelve months which we have just left behind us. For 1889 will long continue to be remembered as the year which, opening under the most favourable auspices and full of promise, has by far exceeded the expectations formed at its beginning. This is true of trade in general, but more particularly so with regard to the iron industry of this country. It does not matter from which point of view we look upon things as they presented themselves in 1889. The production of iron and steel was larger than during any previous year. The export trade was excellent, and to say that the home demand was full but feebly describes the state of trade. But what is by far the most satisfactory feature of the year's trading is that prices rose irresistibly, yet steadily, in sympathy with the growing requirements both of crude and finished material from beginning to end, the only exception being that fit of speculation which set in towards the end of October, lasted throughout November, but died out again in December. Trade was too sound to be upset by this spell of feverish buying, which only tended to inflate prices for a time, but soon gave place to the more rational conditions with which the year closed. It was stated in these columns a twelvemonth ago that a flood-tide set in in the third quarter of 1888 which would carry the iron trade well on into the year 1889. How this has been verified has just been briefly indicated, and will be somewhat more fully described in the review of the year which follows.

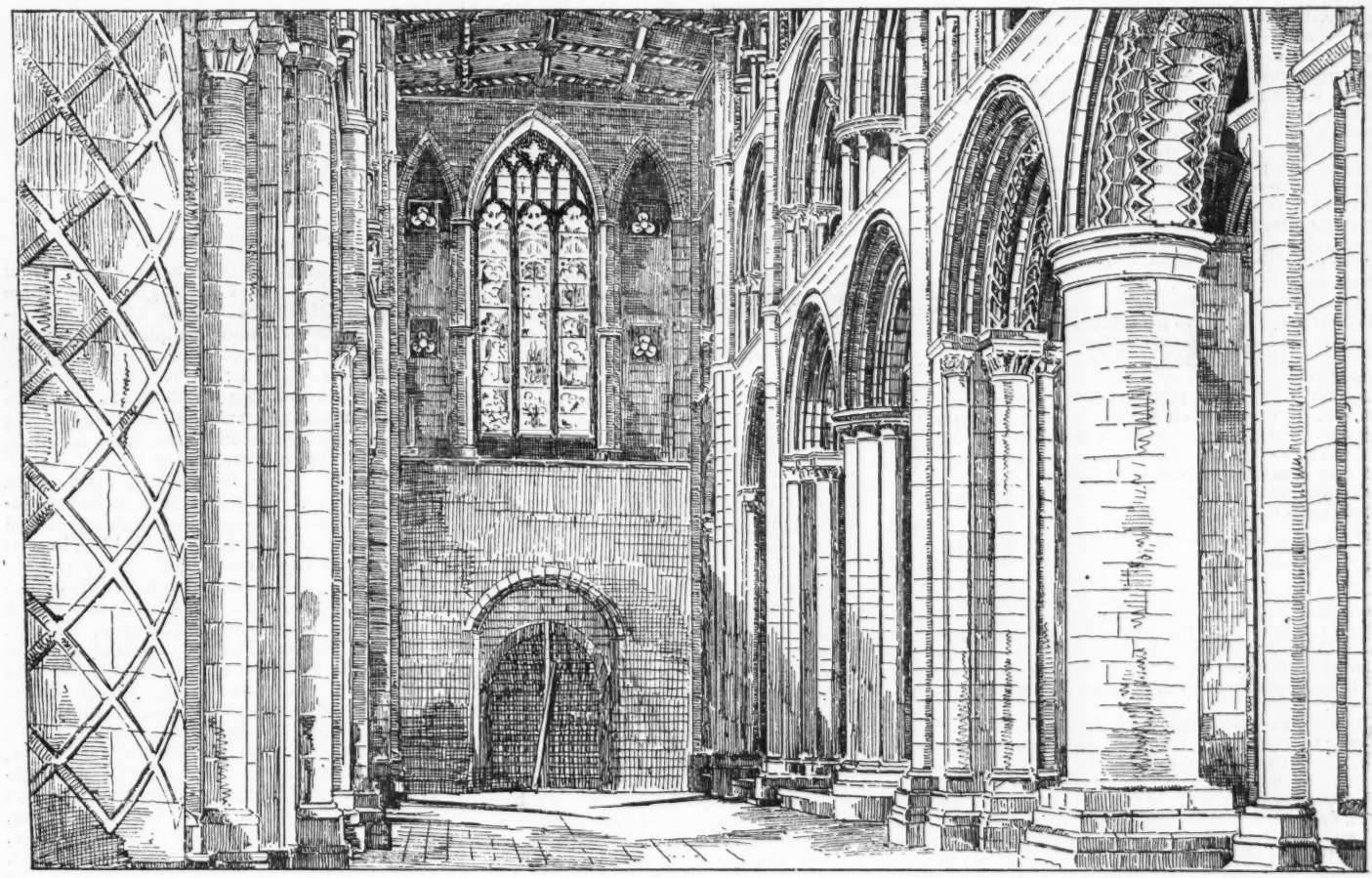
The figures of the total production of iron and steel in the British Isles in 1889 will not be known for some time to come; but the returns for the first six months of the year show a very respectable increase over the corresponding half of 1888, in which year, it will be remembered, the output exceeded any previous year. As being the most complete returns, we merely quote the figures given for pig-iron, of which 4,083,597 tons were produced in 1889, against 3,902,804 tons in 1888. As the activity of the iron trade was greatest in the second half of last year, it may be assumed that the whole year will show a large excess of production. That this surplus of output, and more, was all utilised is demonstrated by stocks of pig-iron at the end of the year being considerably reduced. The decrease of stocks in Scotland alone amounts to 208,593 tons, as compared with the stocks at the end of 1888. While the Scotch output of pig-iron decreased 28,846 tons, the local consumption increased by 173,636 tons, and the shipments by about 22,000 tons. In the North of England the reduction of stocks is estimated at 250,000 tons, the make increasing by about 152,000 tons. Although the production of pig-iron in the North-West has been greatly increased by the lighting of furnaces which had long been idle, the consumption and shipments have quite overtaken the output, stocks showing a decrease of about 52,000 tons. In other districts the decrease has been correspondingly large, while in some localities stocks have almost entirely disappeared. In this respect, 1889 compares most favourably with 1888, at the end of which year heavy stocks still exerted a depressing influence upon the market. The monthly returns published by the Board of Trade present an equally satisfactory picture. According to the returns for the eleven months ending November 30 last, we exported iron and steel of the value of 26,645,371*l.*, compared with 24,346,089*l.* and 22,808,851*l.* in the corresponding eleven months of 1888 and 1887 respectively. The improvements in the last two years, and in 1889 more particularly, has consequently been steady, indicating a healthy state of trade. It has already been shown that the consumption of crude iron for manufacture into finished products was all that could be desired.

But the best criterion of the prosperity of the iron trade in 1889 is the great advance in prices. Scotch pig-iron warrants were quoted in January at 42s., and they closed the year at 62s. 6d., or just 50 per cent. higher. Scotch makers' iron advanced more than 30s. per ton on the year. No. 3 G.M.B. Cleveland iron was quoted 34s. at the beginning of the year, and at its close 60s. 6d. for prompt and 62s. to 63s. for forward delivery. The increase in this class of pig-iron was consequently nearly 75 per cent. The most remarkable circumstance in connexion with the Scotch and Cleveland pig-iron trade occurred at the end of October and the beginning of November, the period of the greatest inflation, caused by speculation, when warrants of Cleveland iron rose to 68s. and even 69s., an increase of 100 per cent., and Scotch warrants to only 64s. (the highest of the year), or 50 per cent. Bessemer iron sold in the North-West in January at 45s. to 45s. 6d., and on November 19 it was worth 78s., receding subsequently to 77s. 6d., but it closes the year at 79s. to 80s. for mixed numbers of Bessemer. It need only be added that in Lincolnshire pig-iron advanced 35s. per ton, in Lancashire and Derbyshire 30s., in Staffordshire 27s. 6d., and in South Wales about 18s. a ton, in order to show to what an extent prices were sent up by a healthy and growing demand and consequent scarcity, speculative influences causing an abnormal rise only during a very brief period.

There was a very large production and a very heavy consumption of manufactured iron. In the North of England alone the output was 425,000 tons, or 35,000 tons more than in 1888, which was far larger than was expected. Prices in that important centre experienced a very substantial improvement, the average advance being about 2*l.* 10s. a ton. Common bars rose in the North from 5*l.* 2s. 6d. to 8*l.*, plates and angles rising in a corresponding degree; in Scotland, from 5*l.* 7s. 6d. to 8*l.* 7s. 6d.; in Lancashire, from 5*l.* 10s. to 8*l.* 5s., and black sheets from 7*l.* 5s. to 9*l.* 15s. In Staffordshire, marked bars were sold in January at from 7*l.* to 7*l.* 10s., while in December they fetched 9*l.* 10s. An advance in marked bars of 10s., or, perhaps, 1*l.*, a ton is fully expected in January. Welsh bars have risen 2*l.* 10s. per ton on the year, their present prices ranging from 7*l.* 10s. to 7*l.* 15s., compared with 4*l.* 17s. 6d. to 5*l.* in January last. With the advance in iron, finished hardwares began an upward movement, at first slowly, owing to severe competition, but in the latter half of the year more in keeping with the higher prices of iron. At the present time manufacturers of hardware are able to obtain full rates, and are provided with an abundance of work, which augurs well for the future. The tinplate trade has not been as prosperous as other branches of the iron industry. Although the output is estimated to have been larger than in any preceding year, and there was, consequently, full employment, while exports were better than ever before, manufacturers of tinplate have had great difficulty in obtaining prices more in accordance with the advanced cost of the raw material. The advance for some descriptions of tinplates has been no more than 1s. 6d. per box, while for other brands it has reached 3s. per box.

Owing to an exceedingly bountiful foreign demand from all quarters excepting the United States, which have almost ceased to buy steel in our market, but no less to home requirements which could only with difficulty be met, the steel trade of the country has passed through a year unequalled in prosperity. The output has been large, beyond any previous record. The foreign trade chiefly included rails, while the home demand came, first and principally, from shipbuilders, but also from railways, the engineering and other auxiliary branches of trade. In this respect the past year resembles its predecessor, for in 1888 the principal run was also upon shipbuilding material for use at home and rails for export. So well are steelmakers booked with orders that the majority of them have at the present time twelve months' work in hand, and this has been secured at prices which cannot be described as otherwise than remunerative, notwithstanding the increased cost of the raw material and fuel. At the same time, it is not at all unlikely that rates for steel will go on improving for some time yet. The advances in the value of steel products have been quite as pronounced as those of finished iron. In the north-west of England, the great steel centre of this country, the increase has been about 65 per cent. Steel rails, which were 4*l.* in January last, are now not obtainable under 7*l.* There has been a large output of shipbuilding material, quite a new industry in the district, and, along with a heavy production, there has been a substantial increase in prices, ship plates having advanced from 6*l.* to 10*l.*, ship angles from 5*l.* 5s. to 8*l.* 15s., and boiler plates from 8*l.* to 11*l.* The other manufactures of the district have participated in the rise; a staple product, tinplate bars, having gone up from 3*l.* 17s. 6d. to 6*l.* In South Wales steel rails are now sold at 7*l.* to 7*l.* 10s., against 4*l.* 10s. at the commencement of the year, while tinplate bars fetch 7*l.* 7s. 6d. to 7*l.* 10s., compared with 4*l.* 15s. in January. In the North of England, steel rails, which were worth only 3*l.* 17s. 6d. to 4*l.* a twelvemonth ago, now realise 6*l.* 17s. 6d. and 7*l.*, while steel ship plates cannot be obtained at under 8*l.* 15s., against 6*l.* 15s. at the beginning of 1889. In Scotland, ship plates have gained as much as 3*l.* 10s., having reached 10*l.*, compared with 6*l.* 10s.

We have already referred to the large consumption of iron and steel by shipbuilders, and we now know that the out-turn of new tonnage has been simply immense. The production of our shipyards in 1889 amounts to the colossal total of 1,270,000 tons of new shipping, which is by 20,000 tons larger than the best shipbuilding record previously,—viz., in 1883, when the tonnage launched was 1,250,000. In 1888 the tonnage of new ships amounted to 904,000, so that last year the improvement over 1888 was 366,000 tons. The chief centres of shipbuilding contributed to the 1889 total as follows:—Clyde, 335,301 tons; Tyne, 281,710 tons; Wear, 217,336 tons; Tees, 110,436 tons; the Hartlepools, 84,109 tons; Belfast, 80,000 tons; Mersey, 35,000 tons. There is every prospect that 1890 will be as good a year for shipbuilders as its immediate predecessor, especially as large contracts have been placed by the Admiralty, most of which will be completed



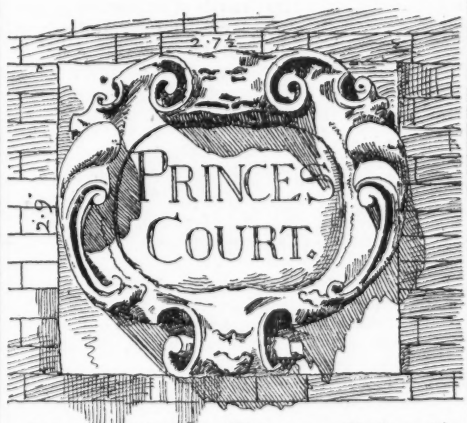
View in Nave, Selby Abbey.

this year, while good bookings have been made in recent months for the mercantile marine. The engineering trades of the country have been as prosperous this year as at any previous period, marine engineers, of course, taking the lion's share; but other departments of engineering have also secured good portions of the orders offering both on home and foreign account. It is a highly satisfactory sign of the times that the recent reports of the trade union societies on the state of trade reveal the fact that not more than one per cent. of its members are at present out of work—a residuum which would never disappear, even if trade were more prosperous that it is now. It is only natural that workmen should have shared to some extent in the prosperity of trade, and it is gratifying to be enabled to place it on record that, so far, no serious troubles have arisen, advances in wages having in most cases been amicably arranged. But it cannot be doubted that, should the present condition of trade continue, there will arise differences as to remuneration which will require much mutual forbearance to smooth over.

Having arrived at the conclusion of what has proved a more satisfactory task than it has been on several previous occasions, a few words may be added as to the future of the iron trade. That that future is bright cannot be denied by impartial observers, the elements of prosperity being still in evidence. There is at present no dearth of money, and to whichever quarter of the globe we look, there are signs that it will be forthcoming to assist in those developments of industry which are the helpmates of civilisation. It is well known that in opening up new countries the iron trade and its related branches play a great part, and from this direction, at any rate, benefits to the trade will result. As has been pointed out, the year upon which we have just entered will provide ample work for shipbuilders, and these in their turn will make large demands for material. Another fact, and an important one, should not be overlooked. The prosperity of the iron trade of this country is participated in, to a greater or less degree, by the iron industries of foreign countries, and bears the same promise of permanency. Under these conditions, the prediction may be ventured that 1890 will not be far behind 1889, if it does not excel one of the most prosperous years of the present decade.

OLD TABLET IN PRINCES-STREET, WESTMINSTER.

WE give this as an addition to the illustrations list of old street tablets in London, of



Old Tablet in Princes Street, Westminster.

which several sketches were published in the *Builder* for December 14 of last year.

Society of Arts.—The meetings of the Applied Art Section of the Society of Arts will commence on January 28, when Mr. Edward C. Robins, F.S.A., will read a paper on "The Relation of the Fine Arts to the Applied Arts." At subsequent meetings papers will be read on February 11 by Mr. W. R. Lethaby on "Cast Iron and its Treatment for Artistic Purposes;" on March 4, by Mr. James Orrock, R.I., on "The Claims of the British School of Painting to a thorough representation in the National Gallery," when pictures by illustrious English masters whose works are not included in the National Gallery will be exhibited by the reader of the paper; on March 25, by Mr. H. Arthur Kennedy, on "Glass Painting"; on April 15, by Mr. C. Purdon Clarke, C.I.E., on "Modern Indian Art"; and on May 13, by Professor W. C. Roberts-Austen, F.R.S., on "The Use of Alloys in Art Metal-work."

Illustrations.

VIEW OF SELBY ABBEY.

SELBY Abbey was referred to by Sir Gilbert Scott as the only one of the Yorkshire Abbeys not wholly or partially in ruins. The restoration carried out under Sir Gilbert Scott's direction left the nave in a safe state for many years to come; but the choir is now in so dilapidated a state that it has been thought necessary for safety to remove the services into the nave, and the expenditure of a few thousand pounds will be necessary merely to put the choir into a state of security against downfall.

The following quotations are taken from a recent report on the state of the building by Mr. J. Oldrid Scott:—

"It is more than two years since I drew up a specification, at the request of the churchwardens, for the restoration of the north transept; its condition at that time was very serious, but it was found impossible to undertake the work at once, and in the meantime the mischief has increased. Cement tests, which were then placed across the cracks, have given way, showing that there is a movement towards the north actually going on.

The walls are bulged to a very dangerous extent, and the condition of the great window is such that a calamity may occur at any time.

I therefore venture to urge on the inhabitants of Selby, as well as on others interested in the Abbey, the absolute necessity and duty of taking prompt measures to arrest the evil which is at work, and to place the transept in a condition of safety.

The plans I have already prepared include the restoration of the gables and pinnacles, as well as the addition of an outer roof of higher pitch, such as the transept once had. I fear it may not be possible to raise the funds now for this part of the work, and although it is most desirable that it should be carried out before long, yet it may be postponed for a time, and the restoration limited to the essential works of underpinning the foundations, rebuilding the window, and securing the walls, roof, and ceiling.

Until this has been done, the Abbey cannot be looked upon as secure, and a very heavy responsibility must rest on those charged with its maintenance.

Besides this work of repair, there are various other parts of the Abbey which call for attention. Among these the choir certainly takes the first place. It is of the finest possible design, its scale is magnificent, and the beauty and richness of its details almost unequalled, and yet owing to the

injuries it has received and to the accumulation of whitewash and dirt, it has an air of neglect which is very depressing. It suffered considerably from the fall of the tower in the seventeenth century, one bay of its groining being destroyed, and the western part of the south aisle, as well as the clear-story, being ruined. It was this that led to the insertion of the very hideous windows which are such a serious blot on the beauty of the choir. Whether it will be possible to remedy all these defects now I do not know, but I understand that the cleaning and repair of the stonework of the choir will be taken in hand at once, and I would strongly plead that at least the reinstatement of the missing part of the groining and the restoration of the south-west clearstory window should be done at the same time. . . . .

It is earnestly to be hoped that a vigorous effort may at once be made to place the north transept in a secure condition, and also to deal with the choir. The one work will make but little difference in the appearance of the Abbey, but it is absolutely necessary and will carry great and lasting satisfaction with it. The other, on the contrary, will have a most striking effect on the whole interior, bringing out the great beauties of the building, and removing for ever that heavy cloud of neglect which for the last three centuries has shrouded one of the finest of all the Yorkshire Abbeys."

In a further report, dated Nov. 9, 1889, Mr. Scott says—

"In my report dated Sept. 17 last, my remarks are confined to such works of repair as you then expressed your hope of being able to accomplish. Since then I have had an examination made of the condition of the roofs of the choir and its aisles, and beg to put before you the result of that examination.

Although some of the timbers of the choir roof appear to be in fairly good condition, others have deflected, and the ends of many of the rafters appear to be decayed. The whole construction, from want of a longitudinal tie, has inclined to the east, exerting a thrust against the east gable. It is probable that when the roof is stripped, some of those timbers which, from the underside, appear to be sound, will prove to be more or less decayed, as leakage in the lead covering must have been going on for very many years. The tie-beams are nearly all defective, and need to be renewed.

The boarding on which the lead is laid is in great part decayed and broken. The lead covering is very faulty, there being holes in many places. Some sheets have slipped down to such an extent that they no longer lap, and the whole surface has been patched and repaired with solder, which has since cracked. The rain admitted by this defective covering is not only causing decay in the roof itself, but is doing mischief to the oak groined ceiling below.

It is most important that the choir roof should be made watertight before any improvements are made to the floors and fittings below. To effect this the whole roof must be stripped, repaired, and re-covered, the present lead being re-cast and re-used.

The roofs of the aisles and choir are in much the same condition, though here the construction needs strengthening by the insertion of additional timbers, besides the repair of the defective rafters and plates.

The whole of the external masonry, including that of the transept, needs pointing, and in some places the renewal of carving. Fragments of the tracery and carving frequently fall, doing injury to the roofs, from want of this attention."

The Vicar, the Rev. A. G. Tweedie, is endeavouring to interest the public in this, which may be called a national work, the resources of Selby itself being limited. The Vicar, we understand, takes an entirely conservative view of the matter, and is desirous mainly to preserve the church and put it in proper repair, not to enter upon "restoration" in the sense in which the word is too often understood. It is partly with the desire to aid in this work by calling attention to the grand style of this ancient building that we have made it a prominent feature in the illustrations to this number.

The view, showing the exterior of the choir from the south-east, was drawn expressly for this occasion by Mr. Arnold B. Mitchell, from studies and sketches made on the spot.

We add also a view of a portion of the nave, drawn from a photograph.

"THE PALACE."

ALTHOUGH we know pretty well what a Mediæval cathedral was like in the days of its splendour, and we can realise the dignity of an abbey and the sombre and solid sternness of an ancient castle, yet we are rather puzzled and confused in our notions of an old Gothic palace. Undoubtedly this arises from the fact that the examples of Mediæval palaces in an unaltered condition are so extremely rare,—in fact, it may be said, without exaggeration, that we do not possess,—in Northern Europe, at any rate,—a single specimen of a Mediæval Gothic palace of the first-rate magnitude. We can, of course, find amongst the great palaces of our own country, of France, Germany, and the Netherlands, portions of buildings, and features left from the Middle Ages, but these are surrounded by works of a later time, so that the harmony of the old design is lost. This is exactly the case with the great palaces of Prague, Salzburg, &c. When seen from a distance, with the towers and pinnacles of the Cathedral and Benedictine Church, both of which are enclosed within its walls, rising over it, the palace of the Hradschein at Prague does indeed give us some notion of the splendours of a Mediæval Royal palace; but, unfortunately, upon close inspection it will be found to be nothing but a huge architectural patchwork, the greater portion of which is made up of seventeenth and eighteenth century Renaissance erections. The great Hall of Ladislaus, with its vast vaulted roof, and the tower of Dalliborka, seem alone to have escaped the botching and plastering-over of the late Renaissance men.

In our article upon Mediæval Paris, in January last, we showed how the ancient palaces of that city had almost entirely disappeared, and we have also accounted for the disappearance of the palaces of our own Kings in London and Westminster. Of their country and suburban residences some remains are still to be seen. The hall at Eltham is, indeed, a noble relic, and the old gateway at Richmond not uninteresting. Hampton Court, at least as far as its ancient portion is concerned, can scarcely be looked upon as a "Royal Palace" architecturally considered, for it was constructed to be the dwelling of a churchman, and possesses, in a marked degree, an ecclesiastical character. Much has been said of Wolsey's magnificence and love of ostentation, but it must be acknowledged that they do not display themselves at Hampton Court, which is a singularly sober and quiet example of Tudor architecture, the only very elaborate portion being the Dining Hall, which is known to have been erected after Wolsey's disgrace, and does certainly give us some idea of palatial architecture. Of the old palaces of Deptford and Kennington we know nothing. Placentia, at Greenwich, and "Nonsuch," in the parish of Cheam, are represented in old drawings, and would appear to have been elaborate buildings. No remains, however, of them at present exist. In the dearth of examples of old Royal palaces, one is thrown back upon descriptions of them, and here none is certainly more interesting than that given by Chaucer in a poem called "The House of Fame," from which we take the following extracts:—

"When I was from the Egle gone
I gan behold upon this place
And certaine or I further passe,
I woll you all the shape devise,
Of house and citee, and all the wise,
How I gan to this place approche,
That stood upon so hie a roche . .
* * * * *
Tho gan I on this hill to gone,
And found on the coppe a wone,
That all the men that been on live,
Ne han the conning to discrive
The beaute of that ilke place,
Ne coud caste no compace,
Soch another for to make,
That might of beauty be his make (or "mate")?
Ne so wonderly ywrought,
That it astonieth yet my thought,
And maketh all my witte to swinke
On this castell for to thinke,
So that the great beautie,
The caste, crafte, and curiositie,
Ne can I not to you devise,
My witte ne may me not suffise
* * * * *
All was of stone of Berile,
Both the castell and the toure,
And eke the hall, and every boure,
Without peeces or joynings,
But many subtell compassings,
As babeuries and pinnacles,
Imageries and tabernacles,
I saw, and full eke of windowes,
As flakes fallen in great snowes,
And eke in each of the pinnacles
Weren sundry habitacles
In which stooden all withouten,
Full the castle all abouten."

Here follows a description of the statues occupying the various niches, which were so numerous that he says that if he were to describe those

"Of all the people that I sey,
I could not tell till Domesdey."

A fine description is given of the palace gate:—

"I gan forth romen till I fonde
The castell gate on my right honde,
Which so well carven was,
That never such another n'as,
And yet it was by aventure
Ywrought by great and subtill cure;
It needeth not you more to tellen,
To make you too long dwellen,
Of these gates florishings,
Ne of compaces, ne of karvings,
Ne how the hacking in masonries,
As corbettes, and imageries."

This long quotation, which is taken from Chaucer's "House of Fame," gives one some idea of a Mediæval palace of very extraordinary splendour, and the question arises to one's mind, is the palace here described purely imaginary, or does it, to a certain extent, describe some building which was in existence in Chaucer's time, making allowances for poetical colouring and fancy, such, for instance, as the building constructed of "Beryl stone" without jointings, and its standing upon a rock composed of ice? Of course, it must be remembered that Chaucer had a considerable practical experience of palaces, for in July, 1389, he was appointed "clerk of the works" to the palaces of Westminster, and that within the Tower of London, and of certain works being carried out in the Royal manors of Kennington, Eltham, Clarendon, Cheam, Byfleet, Feckenham, and Windsor. It is true that he filled this office for only two years, according to Sir Harris Nicholas,* yet that period, though it might not have given him the experience necessary as a practical builder, or a superintendent of works, would account for his knowledge of architecture, and would suggest the idea that his description of a palace might be founded upon ideas derived from existing edifices. Chaucer, moreover, was a good deal on the Continent. In early life, he got into trouble by joining the Wickliffites, and had to leave the country. He was also sent upon diplomatic missions to Lombardy and to France, and at various times he had visited Hainault, Zealand, and other parts of the Low Countries. We are not aware whether he was ever in Bohemia, though it is not improbable that he knew Prague, at any rate by description, as he was a *protégé* of Anne of Bohemia, Queen of Richard II., and his wife was a foreign lady attached to her household.

In the drawing we publish we have attempted to portray the sort of building which might have suggested to Chaucer the architectural description which he gives of "The House of Fame." With regard to the dome in the centre of the building it is certainly an unusual feature in Gothic architecture, but domes of this description, though uncommon, were certainly occasionally erected in the Middle Ages. That which crowns the tower of the Cathedral at Frankfort, and, the one over the crossing of the minster church at Roërmond, are cases in point.

H. W. B.

* The Memoir of Chaucer, by N. Harris Nicholas. Pickering. 1845.

MONTROSE MEMORIAL, ST. GILES'S, EDINBURGH.

WE gave some description of this monument at the time of its erection (*Builder*, October 13, 1888, page 264). The engraving here given, made by Mr. J. D. Cooper from a photograph, shows the figure and some of the architectural detail contiguous to it; a sketch of the whole monument is added also.

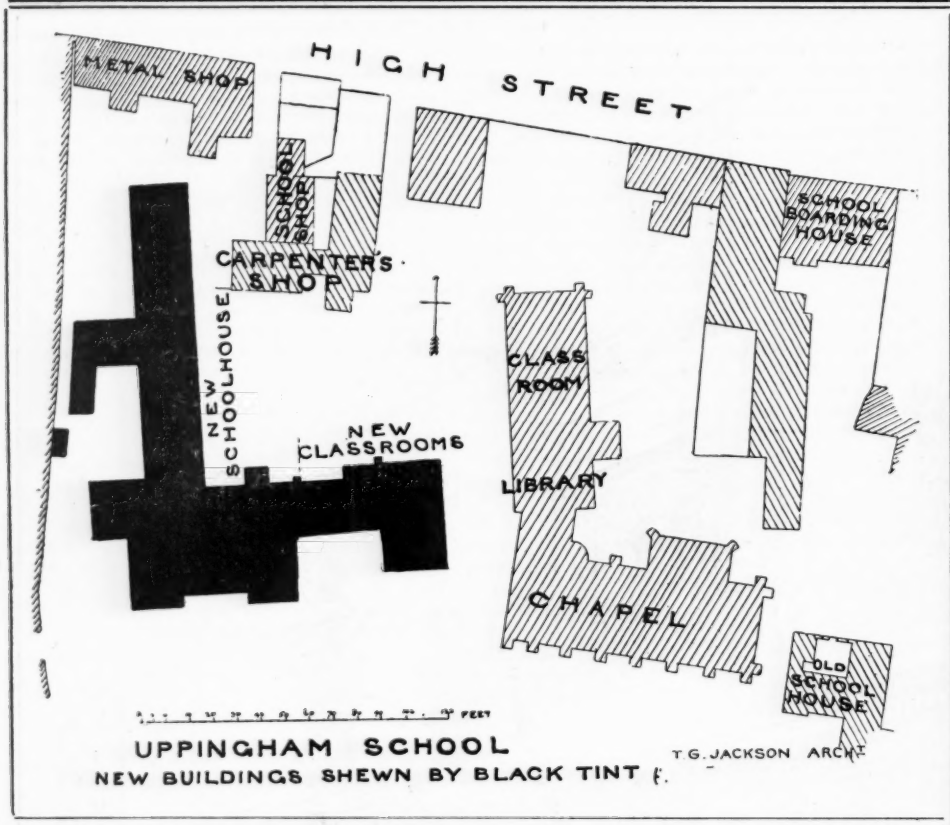
The architectural portion was designed by Dr. Rowand Anderson, and the figure is the work of Messrs. J. & W. B. Rhind; so we are informed, though we do not well understand how two sculptors can be joint artists of one figure. However it was produced, the figure is fine and impressive in its attitude of armed repose; the architectural portion of the monument is effectively designed, and the whole is not unworthy of the remarkable man to whom, so long after his death, it has been erected.

A SCHEME FOR DINING ROOM DECORATION.

THIS is reproduced from a highly-finished water-colour drawing by Mr. Thomas W. Hay, which was exhibited in the Architectural Room of the last Royal Academy, when we commented on it in mentioning the architectural drawings. The design is mainly Greek, though there is a Pompeian flavour about the frieze

THE MONTROSE MONUMENT, ST. GILES'S CATHEDRAL, EDINBURGH.

(See engraving for figure and architectural detail.)



decorations. The coffers of the ceiling are decorated in gilding on a blue ground.

The drawing was one of the most effective of its class in the Academy Exhibition.

DETAILS, ST. MARK'S, VENICE.

THE drawing of the capital, by Mr. Gerald Horsley, was exhibited in the Royal Academy Architectural Room, the year before last. The cap crowns a marble column in the north transept in St. Mark's; the carving is gilt; the ornament of the abacus is inlaid; and the soffit of the arch which it carries is decorated in mosaic.

The other drawing, also by Mr. Horsley, represents a niche and emblematic sculpture in the north front of St. Mark's.

CHANCEL, HOLY TRINITY CHURCH, CHELSEA.

THE drawing gives a sketch of the chancel of this church as it is intended to be finished, with the chancel screen and gates. The front screen is to be of marble, with wrought-iron gates and copper enrichments. The architect is Mr. J. D. Sedding.

UPPINGHAM SCHOOL, RUTLAND.

THE new buildings for Uppingham School now in progress, from Mr. T. G. Jackson's design, consist of a school-house for the head-master, with accommodation for thirty-five boarders, and six class-rooms for the use of the school. They are so arranged as to form a quadrangle in conjunction with the hall and chapel, built by Mr. Street about twenty-five years ago.

The present head-master's house is a picturesque building, but inconvenient for its present purpose; it was originally the hospital for bedesmen, which formed part of the foundation of Archdeacon Johnson in 1584. This ancient building will, of course, be preserved, though converted to other uses.

The general contractors for the new work are Messrs. Parnell & Son, of Rugby; and the heating and ventilation will be carried out by Messrs. Haden & Son. Mr. Evans is the clerk of works.

FONT AND CANOPY: ST. PETER MANCROFT, NORWICH.

THE restoration of this well-known font-canopy was undertaken at the expense of a Norwich gentleman (who, unfortunately, did not live to see the completion of the work), as a memorial of her Majesty's Jubilee. The lower part of the structure, consisting of the octagonal platform, as well as its cresting and the four posts and four corresponding pendants, are original. Before the restoration they were thickly covered with black paint, and the figures in the niches had been hacked out. A slight structure of no interest, which had once taken the place of the original font-cover, had long been out of use, and was roughly propped upon the platform, over the octagon opening through which the original cover must have slid up and down. Although a careful search was made, no drawing or description of the original upper part of the canopy could be found, and the restoration of the upper part and of the font-cover, which can be slid up into it when the font is in use, is purely conjectural, although founded upon the canopy at Trunch Church in the same county, which is believed to be the only similar structure in the country. The material is oak, and when the black paint was cleaned off it was found that the wood had been at one time coloured, though apparently very roughly, in red, green, and white, with gilt crockets, finials, &c., as is usual in late Mediæval woodwork. The old font had lost,—evidently by violence,—every trace of ornament or moulding, and was replaced by a new one. Mr. J. E. Knox, of Kennington, executed the work with exceptional care and skill. The architect was Mr. Frank T. Baggallay.

ST. PAUL'S CATHEDRAL.

SIR,—Hearing that Mr. Watts' design for another of the spandrels in St. Paul's had been executed in glass mosaic, I went round to see it on Saturday, but the day was so dark that the gas had to be lit. The composition seems to me to be very fine, the long sweep of the angels' scroll binding the whole composition together.

I was happy to learn that the remaining five were to be finished in mosaic as rapidly as possible; three more from the designs of the late A. Stevens, and the two others of St. Mark and St. Luke from those of Mr. W. Britten. Some years ago two beautiful dancing figures of his were engraved in the *Art Journal*, and so much did they please that they were at once annexed by an enterprising manufacturer, and we have seen in the last few years figure friezes of his in the exhibitions, so that we may confidently hope that his compositions will not be unworthy of their companions. It is a great deal to say, as the rest are the compositions of two of the great masters of their craft.

It is to be hoped that the rest of the decoration will be now taken in hand. A drawing,—or, better still, a painted model,—should be prepared, so that the whole tone of colour may be made, not only harmonious, but dignified,—no easy task, when the whole of the architecture is of a very light warm grey. If the composition of the parts were entrusted to able men, and the designs, when done, were submitted to the Royal Academy for criticism and approval, we should be sure to have something worthy of the metropolis.

Jan. 1, 1890. G. AITCHISON.

LIMITING THE HEIGHTS OF BUILDINGS.

SIR,—Mr. Somers Clarke (p. 463 in last week's *Builder*) writes in some dismay at the prospect of 70 ft. being fixed as the limit of the height of front walls in London, thinking that it would be better to arrange for gables and give-and-take adjustments in clause 70 of the new Bill. The clause must be regarded as the first step, and only the first step, in a new direction. The heights of new buildings in new streets of less width than 50 ft. are already determined by sec. 85 of the Act of 1862. Their height cannot exceed 49 ft. 11 in. in a street of that width if the front wall is brought out to the footpath. If it is set back, then the width of the forecourt may be added to the width of the street, in order to give the height of the parapet, or eaves, of any building, "except a church or chapel."

The principle of Mr. Whitmore's Bill once adopted, and the regulation of the heights of buildings in old streets and streets over 50 ft. in width once sanctioned by Parliament, many details will no doubt be dealt with logically as time goes on. We shall, however, all agree that the first step may as well be taken in exactly the right direction.

It will probably be considered undesirable to stop at the mere regulation of the height of front walls, for then ingenious persons will have no hesitation in arranging for roofs out of all proportion. If there are no limits to the heights of roofs, 70 ft. of front wall may occasionally be surmounted by 40 ft. (or more) of curb roof,—sloping at the rate of 1 in. to the foot,—3 ft. 4 in. out of the vertical in four stories. This would be looked upon with nearly as much dislike as 110 ft. of vertical wall by the passer-by, and with much disfavour by many others.

Public opinion seems ready for the limitation of the number of dwelling-rooms in roofs,—although, perhaps, not ready for the prohibition of them, as in Vienna. Fearful events, due to large combustible roofs, may startle the world some day, and then, in place of placid acceptance of new legislation, there will be frenzied shrieks for it. Cannot something be done at once in Parliament, without the assistance of the shrieks?

A suggestion has been made that the limit of height should be the top of the topmost story (habitable), and that only two stories in roofs should be allowed. The practical working of this would be that, although the front walls might take any form which the building-owner desired, they would not be carried far above the top ceiling, except by people anxious to contribute to the adornment of our streets. Eccentricity of some sorts is a great trial, but might be tolerated for the sake of the better sort. Additional variety would also result from the London County Council allowing,—under special circumstances and proper conditions,—habitable rooms to be put at greater heights above the street (but only two stories of them in the roof in any case).

If the height to the ceiling of the topmost story was made the limit, an addition to 70 ft. might be argued for,—70 ft. is, however, no trifling height. It means, at least, six stories above the street level in a good dwelling-house, and reasonable people do not ask for more in any numbers. Rights of light, opposite and around, have controlled and will probably always control, aspirations in many situations; but where there have been no fetters there has rarely been shown a desire for the fatigue of too much freedom. Public buildings must always be regarded as exceptional; and flats, probably,—though their future is as yet very uncertain. The whole subject of the general policy and details should receive careful attention from the profession, and all who are interested in the welfare of cities.

While recognising the comfort and efficiency of a consolidated Act, let me venture to suggest that the supplementing of existing Acts may prove, for the present, a prudent course for the Council. Each amendment is an experiment, and it may be well to obtain authority for novelties, and see the result; and a body new to the work may be pardoned for making haste slowly with heavy tasks. The pruning off of obsolete, and the introduction of new, provisions, the making of one Act, thrown into a

logical form, out of several Acts, is, however, to be hoped for.

It may be desirable in the future to have a new Act at periods of about fifteen years. If the Bill of 1870 could have been altered and passed in 1871 (sixteen years after 1855, when *the* Act was passed), we should have been entitled, at that rate of change, in 1885 to another consolidated and amended Act. In these quickly-moving days Building Acts should not be kept going after many defects have been discovered.

A DISTRICT SURVEYOR.

10, BOW-CHURCHYARD.

SIR,—I observe in your last week's issue a "Note" on No. 10, Bow-churchyard. I described this house in the *Antiquary* for May, 1889, under the sign of the Maidenhead. I am aware that Messrs. Sutton & Co. used to print on their billheads the Royal arms and a boar's head, which they affirm to have been the sign of the house before the present system of numbering came into vogue, but I am inclined to think they are mistaken, as it seems unlikely that the title of a well-known and successful place of business would have been changed without apparent cause. At any rate I await further proof. I have examined the sign very carefully, and it bears no resemblance to a boar's head. One may be tolerably sure that the date is 1669. We know that this part of the city was consumed in the Great Fire, and the date on the cistern is corroborative evidence.

Here is another advertisement issued from this house; it is inserted in the *London Journal* of 1724:—

"To all Shopkeepers.—At Cluer's Printing Office, at the Maidenhead, in Bow Churchyard, shopkeepers' bills and bills of parcels are curiously engraved on copper-plates. . . . . Titles for Hungary water, directions for Daffey's elixir and the spirits of scurvy grass, funeral tickets in curious borders engraved on copper-plates, may be had there ready printed.

Also receipts for the King's taxes are printed and sold there, wholesale or retail."

I should like the question of the sign to be solved, and I believe the early deeds are non-existent.

P. N.

CHURCH BUILDING NEWS.

Bournemouth.—New carved oak choir-stalls and reading-desks are shortly to be placed in St. Michael's Church, Bournemouth, from designs by Mr. Reginald Pinder, F.R.I.B.A. A contract has been entered into with Mr. Holmyard, carver, of Bournemouth, for the first part of the work.

Jesmond (*Northumberland*).—The chancel of St. George's Church, Jesmond, has now been elaborately decorated. According to the *Newcastle Chronicle*, the entire available wall space has been covered with mosaic, somewhat after the manner of the famous fifth and sixth century mosaics in the churches of Ravenna. On the north and south walls are ranged the twelve Apostles, on a line as to height with the three mosaic figures of Our Lord and the Archangels Michael and Gabriel, which form part of the original decoration of the east wall. At the south side, at the east end, the first figure is that of St. Peter with the keys; next comes St. Andrew with a cross; then St. James the Major, with a staff; next St. John, holding a chalice with a serpent issuing from it, alluding to the legend of his driving the devil in that form from a cup of poison; then St. Philip with a staff and cross; and last St. Bartholomew with a flaying-knife, with which he is supposed to have been killed. Following on the north side first comes St. Jude with a halberd; next St. Simon, with a saw, with which he is supposed to have been cut in two; then St. Thomas, with a builder's rule; next St. James the Minor, with a club, with which he is supposed to have been killed; then St. Matthew, with a purse; and lastly, St. Paul (instead of Judas), holding a sword, thus completing the twelve. The background to these figures and to all the forms of ornament embraced in the scheme is of a deep blue, slightly varied in tone over the surface, giving a quality to the colour not possible when each tessera is of a precisely similar tint. The blue ground is carried above the figures for a distance of 2 ft., isolating the figures to some extent from the elaborate composition applied to the higher part of walls, and thus giving form and distinctness to the human element of the scheme. Above the plain surface of background comes a deep band of enriched conventional foliage, disposed in almost imperceptible gradations of colour, so that no part is aggressive, yet the flowing forms of ornament retain their value, and complete the decorative intention up to the wall string, level with the sills of the clearstory windows. From this point to the roof cornice the space is covered with conventional ornament. On the east wall the same motive underlies the design. The spandrels over the arches to the organ chamber and the morning chapel are filled with figures of angels, having in each one wing outstretched to fill the triangular space of spandrel. The first angel bears the sword and crown symbolical of martyrdom and its crown; the second bears an orb and cross, symbols of Christianity dominating the world; the third and fourth angels represent acts of praise. The massively-panelled wooden ceiling of the chancel is richly painted in a scheme of blue, ivory, and gold, each panel containing a separate design embracing the legends of the Pelican, the cross of Constantine, and the ingenious arrangements of freely-treated Mediæval foliage, &c. The deeply-moulded ribs are overlaid with gold, the combinations giving a most sumptuous decorative result. The entire scheme of decoration is the work of Mr. T. R. Spence, the architect for the church, with the exception of the Apostles, the designs for which were prepared by Mr. C. W. Mitchell. The mosaics have been executed by Messrs. Rust & Co., of London, and the painted ceiling by Mr. C. S. Wardropper, of Gosforth. The whole cost has been defrayed by Mr. Mitchell, of Jesmond Towers, the munificent founder of the church. The cost of the church up to the present has been at least 20,000*l*.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—I.

INTRODUCTION.

THE following articles are written for those who are already acquainted with such elementary facts and phenomena of electrical science as are fully explained in the many excellent little text-books now published on the subject, but who are desirous of acquiring, in an elementary form, some further knowledge of those branches of the science which are more intimately connected with "Electricity Supply" on a large scale.

Perhaps the simplest method of electrifying bodies, or charging them with electricity, is friction. If two dissimilar bodies are rubbed together, under proper conditions, they become electrified and will attract each other, but if a third body is electrified by contact with either of the rubbed bodies, it will then be repelled from the body with which it has been in contact.

Theories of Electricity.—To account for these facts Symmer suggested the theory that all bodies contain an imponderable fluid, which is a combination of two kinds of electricity—positive (+), and negative (−).

When these two kinds of electrical fluids are present in precisely equal quantities they exactly neutralise each others' effects; but, when a body becomes electrified, it possesses an excess of one or the other of these fluids, and is said to be positively or negatively electrified according as there is present an excess of positive or negative electricity.

This is known as the *two-fluid theory*.

Between two bodies similarly electrified there is repulsion, but between a positively and a negatively charged body there is attraction.

It was observed, however, that positive electricity could not be produced without the production of an equal quantity of negative electricity. This fact led Franklin to propose the *one-fluid theory*, and to regard the process of electrification as the transference of electricity from one body to another. A neutral or unelectrified body must, by this theory, be regarded as possessing a certain normal amount of electricity (generally assumed positive), and when a body becomes electrified it is by a second body transferring electric fluid to or taking some from it, hence the expressions positive or negative, implying excess or defect.

Faulty as both these theories may be, they have at all events provided terminology for speaking of and describing certain electrical effects, while avoiding the necessity of any very precise explanation of what electrification really is. But the insufficiency of the old fluid theories is immediately felt the moment the effects, external to charged bodies or to bodies in which electricity is in motion, are considered.

If two bodies, A and B, are placed under the exhausted receiver of an air-pump and charged, say positively, they repel each other, although there is no material connexion between them. The idea that A can act on B across absolutely empty space, in other words, "action at a distance," becomes the more inconceivable the more it is thought about; to a metaphysician the conception may be possible, but to a thinking physicist such a conviction becomes less and less possible. The real means of communication between A and B may as yet be undiscovered, but that a connexion does exist is felt to be a certainty by at all events the vast majority of those who have given careful thought to the question.

Modern theories of electricity are unhappily far from complete, nor can any attempt be made in a short elementary paper to discuss them; but the following theory is at least nearer the truth than the older ones, and will prove useful by affording some explanation of the electrical phenomena to be hereinafter described.

Electricity may be regarded as an incompressible continuous fluid, which permeates not only all matter,—solid, liquid, or gaseous,—but which fills all space. As matter is built up of material molecules and atoms, so may this fluid be conceived as consisting of electrical molecules and atoms; but though these molecules are absolutely incompressible, they are capable of distortion, and when distorted tend to recover their normal condition. Thus, while a given quantity of electricity cannot change its volume, it is capable of *strain*, and possesses *elasticity*.

In space these molecules of electricity are entangled with one another, or are connected like the surfaces in friction gearing, so that free translation, or the slipping of one molecule past another, is impossible; one molecule cannot even rotate without rotating those next it, but this entanglement or friction is modified by the immediate presence of matter; hence the set of electrical phenomena that can be produced by the aid of suitable arrangements of material, such as, for instance, different kinds of metal in an acid solution, effects that cannot be produced in a vacuum or air alone.

How this continuous incompressible fluid can permeate all matter, and above all how matter can freely move through it, it is difficult to see. These difficulties, however, must not condemn such a theory, for we believe in the truth of many things that are just as difficult to understand. Light comes to us from the sun by means of vibrations in the ether, and recent experiments seem to prove conclusively that all electrical effects are due to this same ether,—briefly, that electricity is ether.

That we can see the sun through a solid piece of glass or feel the heat from a fire through a solid piece of crystal are strange facts, but we nevertheless have no hesitation about believing them. In the same way, then, must be accepted the facts that ether or electricity can go through solids and that solids can go through ether or electricity.

The general and apparently contradictory properties of ether have been well-known and accepted for many years, but the connexion between electrification and ether is a comparatively recently-developed theory.

Returning to the three cases of attraction and repulsion by which alone electricity at rest makes itself manifest. In case (α) fig. 1,

(α)	A+	+B
(β)	A+	−B
(γ)	A−	−B

Fig. 1.

suppose A to be a body, say an insulated pith ball, charged positively; that is, the pressure of the electricity within it has been increased above its normal value, so that the pressure on the entangled electricity in the space around it is increased on all sides, though equally; it does not, therefore, tend to move in one direction more than another. The pressure, or "potential" as it is usually called, in the surrounding medium falls to its normal amount as we recede from A, and does so at an equal rate in all directions.

If a second positively charged body, B, is placed near A, the pressure in the space between A and B does not fall as it does in going in any other direction from A. In other words, the electricity in the space between A and B is more squeezed up than in any other direction, and, being in an entangled state, it is not free to re-establish uniformity of pressure; the result is that A is pressed outwards from B, and, since

matter can pass freely through electricity, A moves away from B unless prevented mechanically from doing so. In case (β) B is charged negatively—that is, the pressure of electricity in B has been lowered, and the electricity between A and B is squeezed together less than in any other direction, and A is pushed more from the side farthest from B than on the aide nearest to B: hence if A is positively and B negatively electrified A is attracted to B. Finally, in case (γ), since excess of pressure in A causes it to be urged towards B, defect of pressure or negative electrification will cause it to be repelled from B.

It may be here stated, once and for all, that what might be called the full working details of electricity are not yet understood, and any one who is for the first time regarding electrical phenomena as due to the action of the ether must not feel discouraged if he cannot exactly picture to himself how the ether produces the effects that, with little doubt, it does produce. When two bodies or parts of a system act on one another any theory which supplies a connecting medium must be easier to understand than "action at a distance," which is un-understandable, and it will be seen that this idea of an all-permeating incompressible fluid affords very beautiful explanations of the magnetic and electro-magnetic effects with which these papers will chiefly deal.

Books.

Encyclopédie de l'Architecture et de la Construction. Directeur, P. PLANAT. Vol. iii., premier fascicule. Paris: Dujardin et Cie.

THE first portion of the third volume of M. Planat's dictionary takes us to "chorégiques" (monuments), including the important subjects "château" and "chapiteau"; the former written by MM. A. de Rochas and G. Espitallier, the latter by M. Adrien Joigny. As in the case of other historical articles to which we have referred, the article "château" is treated from a purely French point of view. In regard to the earlier development of the château into a mansion there is no doubt some excuse for this, as the peculiar type of the Francis I. château, a mansion retaining some castellated characteristics, was in the first instance a French development imitated in other countries. But as the article comes down to later periods the reader is still to be left under the impression that there are no buildings of this class worth taking account of out of France. In the later developments the word "château" signifies the same class of building which in English is designated as "mansion," but not a single English or German mansion is alluded to or illustrated in any way; such monuments as Heidelberg and Kenilworth have no existence apparently for the French editor, and the Villa Caprarola is the only Italian one that is named. Under "château militaire" it is just the same, only a few French examples are given, and even a building so historically important as the Tower of London is not alluded to. On the other hand, "Chantilly" has fourteen pages to itself as a separate subject, the article being written and the illustrations furnished by M. Horace Daumet, the restoring architect.

The article "Chapiteau" is very well treated in regard to the Classic or antique portion of the subject; that is a class of subject which a French architect always goes into *con amore*. But the Mediæval capital is much less fully treated, and here again every example is from French Gothic, and the student will never learn from this book that English Gothic had a very distinct character of its own in the treatment of capital foliage in Transitional and Early Gothic periods; and the characteristic types of Norman and Early English moulded capital are entirely left out of sight and no hint or illustration of them given. In short, M. Planat had much better frankly alter the title of his publication before going further, and call it "Encyclopédie de l'Architecture Française." As such it will be, we have no doubt, a most full and admirable work of its class; but it is rather a misnomer to give the title of "Encyclopædia" to a work which, except in regard to Classic antiquity, recognises no architectural style and no architectural monuments except those of the Editor's own country.

The Science of Building. By E. WYNDHAM TARN, M.A. Third edition, 1890. Crosby Lockwood & Son.

THIS book contains many useful suggestions practically expressed, and is one of the best elementary books upon construction suitable for the requirements of architectural students. The second edition underwent a thorough revision, and to the present edition tables of the strength of timber, steel, and stone are added. Rules for finding the strength of iron stanchions and struts of the most usual form of section are given. The friction of water in pipes and principles of ventilation are also alluded to. The work supplies instruction in general mechanical principles; construction of retaining walls, arches, cupolas, and spires; classification, composition and strength of building stones, timber, iron and steel; in short, it may be said that while the book is not exhaustive, it contains in an intelligible manner a very fair epitome of information which could otherwise only be obtained by a perusal of various large and expensive works. Wherever possible, an example of the practical application of a theorem is introduced.

The author's investigations of the thrust of Gothic arches, he reminds us, were first published in the *Builder* for March 31, 1866, and his geometrical process for approximately obtaining the thrust of an arch and the requisite thickness of a pier, was published in our pages, dated December 28, 1867.

The author deserves credit for quoting his authorities, and a copious index concludes the volume.

A Primer of Sculpture. By E. ROSCOE MULLINS. With illustrations. Cassell & Co.; London, Paris, New York, and Melbourne; 1889.

THERE is a great inclination among many people at present, young people especially, to dip amateur hands in the mysteries of sculpture; and we presume it is for the benefit of these aspirants that a Primer of Sculpture is called for. Considering that there is perhaps no form of art in which mediocrity is so entirely intolerable as sculpture, and few which make such demands on those who would gain any real excellence in it, we feel some doubt as to the wisdom of offering this kind of encouragement to amateurs to fancy themselves sculptors. The book may, however, serve well as a first instructor for a beginner who wishes to test, or whose friends wish to test, his possession of any such natural powers as would justify him in devoting his life to sculpture.

General principles of working are very clearly and simply set down, and clear directions are given as to the practical requirements in working in clay, building up a life-size model on a proper foundation, plaster casting, &c.,—all this is useful to a beginner who is going to try his hand without a teacher, if there are any so bold. How completely "primary" is the little treatise may be judged by the fact that the subject of "anatomy" is disposed of in a page and a half, with references to one or two books by the help of which it may be studied.

Taking it for what it is, however, it is well done, and probably the talented sculptor who is the author of it knows as well as any one else that no one will become a sculptor by this means, as indeed he implies in his opening sentence. Perhaps the best recommendation of the book really is, that it gives in a clear manner some general information concerning the processes of an art about which many people, even without aspiring to practise it, feel an interest and a desire for knowledge, which Mr. Mullins has imparted in a very agreeable and readable form.

Blackie's Modern Cyclopædia of Universal Information. With numerous pictorial illustrations, and a series of maps. Edited by CHARLES ANNANDALE, M.A., LL.D. Vols. iii. and iv. Blackie & Son, London, Glasgow, Edinburgh, and Dublin; 1889.

THE fourth volume of this Cyclopædia, the earlier volumes of which we have previously noticed, takes the reader well on into the letter I., and from the prompt way in which the successive volumes are appearing we may expect that this Cyclopædia, issued in successive instalments, will really be finished, and within a reasonable period, in which point at least it will have the advantage over some more ambitious works of the same class. The work seems to be quite keeping up to the standard of the first two volumes. The articles on various subjects connected with architecture, though necessarily brief, are well and correctly done as far as they go. Under "Gothic Architecture" a little too much stress is perhaps laid on the window design of the various English styles, correct illustrations of which are given as identifying the separate styles, which is however perhaps the readiest kind of landmark for the general reader in a dictionary where space cannot be afforded for more varied illustration. It is not quite correct to say that William of Sens introduced the Pointed style into England; it was introducing itself in the transitional abbey arcades before that. Under the head of Greece there is a very fair sketch given in a short space of the characteristics of Greek architecture, and the subject of the correction of optical effects by curvature of the architectural lines is mentioned; a kind of detail not generally found in a popular cyclopædia. The short definitions of "Doric" and other architectural terms are also sufficiently attended to. For its size and scale, the Cyclopædia will be a very useful work.

Mensuration Made Easy; or, the Decimal System for the Million. With its application to the daily employments of the artisan and mechanic. By CHARLES HOARE. Nineteenth Edition. London: Effingham Wilson & Co. 1889.

THE author of this work advocates the use of the decimal system, and has endeavoured, as he states in his preface, "to divest the subject of every difficulty," so as to render it available to the most humble aspirant, and especially to adapt it to the daily employments of the artisan class. Tables of a copious nature are appended at the end of the book, with an explanation of the terms employed,—"terms" being defined by the author as the "Alphabet of Science." We think that, as the author has taken the pains to show on page 83 the method adopted for finding the geometrical mean between any two numbers, and has exhibited the application of such a calculation on page 49, that he would not have exceeded the scope of his object by adding to the Table of Square Roots and Cube Roots the methods by which these results are arrived at. The author expresses the belief that decimal coinage must eventually come into operation in this country.

VARIORUM.

"THE Insurance Year-Book, 1890" (London: Simpkin, Marshall, & Co.) is the fifth annual issue of a very useful work of reference. The present edition more than maintains the excellence of its forerunners, of which we have had occasion to speak in terms of commendation. With regard to the cheap edition, its usefulness would be somewhat increased by printing its title on its back.——"The Gas Engineer's Pocket Almanack and Lighting Table for the Year 1890," issued by Messrs. William Sugg & Co., Limited, London, is a very useful production, and notwithstanding the fact that it is largely occupied with descriptions and illustrations of Messrs. Sugg's many meritorious appliances, it also contains a great variety of information which should certainly be known to all gas-engineers, if not to all gas-fitters and gas-users. We hardly know, though, whether we are right in using the phrase "gas-fitter" now, for just as the plumbers have dubbed themselves "sanitary engineers," the gas-fitters are beginning to call themselves "gas-engineers."——"Sprague's Pocket-book and Diary for Architects and Surveyors" for 1890 (London: Sprague & Co., Martin's-lane, Cannon-street) appears this year in a slightly different cover, but its very useful contents are similar to those of previous issues.——From Mr. Robert Dunthorne, of Vigo-street, we have received a tiny "Calendar for 1890," for carrying in the purse or waistcoat-pocket. Small as it is, it is an admirable specimen of "art-printing" in colours. Opposite to the calendar for each month is a well-executed wood-cut with the appropriate zodiacal sign, treated heraldically. This miniature production is described in the "imprint" as "Made by W. H. Hooper for Robert Dunthorne. Printed by R. & R. Clark, Edinburgh."——The *Field Club* is the name of a new threepenny monthly magazine, edited by the Rev. Theodore Wood, and published by Mr. Elliot Stock, 62, Paternoster-row. Its sub-title is "A Magazine of General Natural History for Scientific and Unscientific Readers." No. 1, for January, contains some interesting articles, and it is nicely printed on good paper. It deserves to succeed.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

106, Chimneys, Chimney-top, &c. E. Hutchins.

According to this invention, a cowl which revolves is so fixed that it, or part of it, may be raised and lowered by a chain which is designed to act as a cleaning chain and to remove soot or obstructive deposit which would otherwise prevent the perfect action of the apparatus.

1,268, Saws. W. Lorenz.

The body of the saw, which is the subject of this patent, only acts as a holder or carrier for changeable cutting edges, which are fixed in grooves or upon heads on the saws or cutters by sliding upon cylindrically-formed ribs or seats on the saw. No springs, screws, pins, or other fastening is employed, and the teeth are preferably made to butt in their rear ends against the next tooth-holder, the front end being left free and formed at an angle suitable for the particular cutting operation.

1,732, Drying or Seasoning Timber. J. W. Scott.

This invention consists in the employment of novel devices whereby a current or currents of air of any desired temperature is, or are, compelled to circulate in such a manner that the air is forced into contact with all the outer surfaces of the pieces of timber or other substances placed in position to be operated upon, and that without depending upon the natural laws governing heated air. Suitable air chambers, with perforated covers, are placed in a building, and air forced over the substances by means of fans. In the case of substances of irregular contour, sheets of fabric are used which deflect the current over every part.

1,863, Sliding Flush Bolt. C. F. Hall.

The bolt which is the subject of this patent is provided with a device by which the rod of the bolt can be raised or lowered without injury to the fingers, and can also be made self-locking, so that it cannot be pushed back from the outside. The automatic fastening is effected by a counterpoise, and the opening is effected by moving a fingerhold, which turns freely, and is in itself part of the fastening.

16,941, Block Paving. H. D. Blake.

In this system of paving a kind of groove or slot is formed laterally around the blocks, which, when the blocks are laid in place upon the roads or ground, enables them to be keyed together in one piece by the introduction into the joints of a suitable cement or mortar. The blocks are portable, and can be quickly and easily laid by inexperienced workmen without the use of special tools or machinery.

17,067, Wood Screws. C. D. Rogers.

The point portion of the screw combines a plain or unthreaded centreing part which first enters the wood or material into which it may be inserted, and a screw thread, which commences at the base of the plain part of the point, and extends backward in a gradually increasing depth, till it reaches the base of the point where it unites with, and forms part of, the full thread formed on the cylindrical or body portion of the screw. By means of a point thus formed, the screw may be first entered true and centrally into the wood by a slight blow, the resistance offered being very small, after which it is driven home by a screw-driver in the ordinary way.

NEW APPLICATIONS FOR PATENTS.

Dec. 16.—20,175, B. Pybus, Door-spring.—20,207, R. Painter, Raising and Lowering Windows.

Dec. 17.—20,240, A. Linford and others, Sash-fastenings.—20,254, S. Eaton and others, Chandeliers.—20,279, A. Chorley Butt, Hinge.—20,294, O. Imray, Metallic Fireproof Structures.—20,303, C. Smith, Artificial Asphalte.—20,307, J. Lorrain, Ventilation, &c.

Dec. 18.—20,341, H. Latham, Fireproof Fire-escape.—20,342, F. Wright and T. Gillott, Flooring for Bridges, &c.—20,344, G. Rydill, Chisels.

Dec. 19.—20,410, W. Cowlin, Opening or Closing a pair of Double Doors simultaneously.—20,452, G. Hayes, Metallic Lathing.—20,454, D. Hunter, Fences and Gates.—20,467, W. Tattersall, Ventilating, &c.—20,470, J. Campbell, Drying Kilns.—20,510, R. Shapland, Drying, Heating, Ventilating, Timber Drying, &c.—20,518, W. Eckersley, Water-waste Prevention Cisterns.

Dec. 21.—20,528, E. Young, Preventing the rattling or shaking of Window-sashes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

4,730, W. Townsend. Chimney-pots.—7,840, B. Boshier, Carpenter's Compasses.—16,715. J. Keighley, Ventilators for Chimneys.—17,243, E. Hollanders, Door Locks.—17,357, D. Bryce, Wall-frames.—18,622, M. Davidson, Floor and Pavement Lights.—18,765, G. Hall, Brick-making Machinery.—18,862, H. Sutcliffe, Water-closets.—18,866, M. Goodwin and W. Doorwood, Flooring.—19,091, F. Rendell, Attaching Sash-cords to Windows.—19,113, F. Lawrence, Connecting Taps with Pipes.—19,468, S. Bott, Sash-fasteners.—19,481, M. Moore, Chimney Cowls, &c.—19,500, J. Hamblin, Fireplaces and Stoves.—19,627, T. and J. Mann, Kitchen Ranges.—19,783, H. Cowan, Window-fastener.—19,872, J. Bredel and H. Zulauf, Closing Doors.—19,885, J. Miller, Door-locks or Latches.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

234, A. Illidge, Opening and Closing Fanlights, &c.—515, A. Day and F. Green, Window-sash Fasteners.—2,692, W. Poole and A. McDonald, Testing Joints and Drainage Pipes, &c.—2,817, W. Laycock, Opening, Closing, and Securing Windows, &c.—2,883, T. Davis and J. Dougall, Grinding and Polishing Marble, &c.—2,946, H. Lake, Brick-making Machines, &c.—2,993, J. W. and R. Mathieson and A. Turnbull, Stoves and Cooking-ranges.—3,190, G. Dickison and W. Brodie, Water-closets and Traps.—4,087, F. Lane, Horizontal Saw-frames.—7,109, A. Rammage, Fireproof Partition for Building Construction.—17,199, D. Mersing, Veneer Saws.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

DEC. 18.—By CHINNOCK, GALSWORTHY, & CO. (at Taunton).

Taunton, near—The Norton Manor Estate, containing 940a. 2r. 30p., f. £38,000

DEC. 19.—By DYER, SON, & HILTON (at Woolwich).

East Wickham—Four cottages and 4a. 2r. 21p., f., r. £61. 16s. 745

By WORSFOLD & HAYWARD (at Dover).

Dover—49, Military-rd., f., r. £15. 15s. 250
2, Bowling Green-hill, f., r. £15 175
14, Dour-st., u.t. 81 yrs., g.r. £2 270
Buckland, Oswald-pl.—Three plots of f. land 140

[*Contractions used in this list.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

SATURDAY, JANUARY 4.

Association of Public Sanitary Inspectors.—The Rev. Arthur Robins, M.A., on "Human Homes for the Poor, the Question of the Hour" (Carpenters' Hall, London Wall). 6 p.m.

Royal Institution.—Professor A. W. Rücker, M.A., F.R.S., on "Electricity" (adapted to a juvenile auditory, III. 3 p.m.

MONDAY, JANUARY 6.

Surveyors' Institution.—8 p.m.

Clerks of Works' Association (Carpenters' Hall).—Mr. W. Browne on "The Construction of Theatres." 8 p.m.

Liverpool Architectural Society.—Mr. J. L. Thornely on "Monumental Brasses, with special reference to the towns of Lancashire and Cheshire." 7 p.m.

TUESDAY, JANUARY 7.

Royal Institution.—Professor A. W. Rücker, M.A., F.R.S., on "Electricity." 3 p.m.

Glasgow Architectural Association.—Mr. F. M. Miller on "Domestic Furniture."

WEDNESDAY, JANUARY 8.

Civil and Mechanical Engineers' Society.—(1) Annual General Meeting for Presentation of Accounts. (2) Mr. H. H. Parkinson on "Prices for Labour and Material in India." 7 p.m.

THURSDAY, JANUARY 9.

Royal Institution.—Professor A. W. Rücker, M.A., F.R.S., on "Electricity." V. 3 p.m.

Edinburgh Architectural Association.—Mr. J. Balfour Paul on "Some Early Scottish Architects." 8 p.m.

FRIDAY, JANUARY 10.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Chatterton on "The Irrigation Works on the Cauvery Delta." 7.30 p.m.

Miscellanea.

Competition: Free Library, Notting-hill, W.—In a recent limited competition for the proposed new Free Library at Ladbroke-grove, Notting-hill, W., plans were invited from eight architects nominated by the Commissioners. At the final meeting held to consider the plans, the design bearing motto "Tree of Knowledge" was selected, the authors of which were found to be Mr. T. Phillips Figgis, A.R.I.B.A., and Mr. H. Wilson.

Clock, East Garston, Berks.—A large clock has just been erected in East Garston Church Tower,—the anonymous gift of a parishioner. It chimes the quarters on four bells, strikes on the largest bell, and has a bold face fixed on the south side of the tower. The bells have also been re-hung; Mr. White, Appleton, was the bell-hanger, and Messrs. J. Smith & Sons, of Derby, made the clock.

Proposed New Board Schools for Acton.—Mr. Edward Monson, jun., A.R.I.B.A., has been instructed by the Acton School Board to prepare drawings for the erection of the proposed Beaumont Park Schools, Acton-green, which are intended to provide accommodation for 300 boys, 300 girls, and 400 infants.

The Bristol Building Trade in 1889.—A correspondent writes:—"Inquiries made to ascertain the state of the Bristol building trade in 1889 show that a decided improvement has taken place, and local builders, in addition to work in the immediate neighbourhood, have found scope for activity in a number of towns in the west, such as Bath, Trowbridge, Cardiff, Crosscombe, and Shepton Mallet. In house building in Bristol there has been a distinct advance, and the stagnation of several years is quickly passing away. One feature of the modern residence building is that on the whole the quality is much improved to what in too many cases it was formerly noticed to be. This improvement has been seen not only in the better-class houses, but in the smaller residences, rented at between 18*l.* and 30*l.* a year, in which materials and convenience are more studied than they used to be. One of the most frequent faults still to be found in such properties is the insufficient space and ventilation between the flooring and the ground, a method of procedure conducive to unhealthiness and dry rot in joists and sleeper walls. In the neighbourhood of Bishopston, a middle-class district just outside the Bristol boundary, house building has gone on most rapidly."

The Sanitary Institute.—At an examination for Inspectors of Nuisances, held at Manchester on December 20 and 21, twenty candidates presented themselves. Questions were set to be answered in writing on the 20th, and the candidates were examined *vivâ voce* on the 21st. The following candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspectors of Nuisances, viz.:—Messrs. Allen Cameron, Newbottle by Fence Houses; James Crossley, Salford; Samuel Saunders Dean, Hugglescote, near Ashby-de-la-Zouch; Thomas Eddleston, Great Harwood, Blackburn; Edwin Gardiner, Liverpool; John Maclennan, Dunfermline; William Milner, Preston; Christopher Osselton, Houghton-le-Spring; John Shirras Robertson, Aberdeen; Walter Sutherland, Walton, Liverpool; James Whitehead, Parkgate, Rotherham; and Charles Edward Wood, Wakefield.

Examinations for Plumbers.—Under the auspices of the Plumbers' Company, examinations of candidates for registration have lately been held in Dublin. Mr. John Smeaton, master plumber, and Mr. R. J. Lyne, United Operative Plumbers' Association of Great Britain and Ireland, were present to represent the London Board of Examiners. The local examiners were Messrs. W. Baird, H. Kerrill, J. Smith, D. P. Curtis, and T. W. Little, master plumbers; Messrs. H. Murphy and J. Shiels, operative plumbers; Messrs. Spencer Harty, C.E., City Engineer, P. F. Leonard, C.E., and W. Kaye Parry, C.E., architect. The examinations included tests of practical work and sets of questions relating to materials, construction, and sanitary arrangements. Forty per cent. of the candidates succeeded in passing the examinations.

Partnerships.—Mr. James Hill, of 101, Queen Victoria-street, announces that he has, from the 1st of January, 1890, admitted into partnership Mr. E. J. How and Mr. H. King, both of whom, he says, have rendered him long, valuable, and faithful services in the management of his business. The name and style of the firm will remain "James Hill," as hitherto.——The partnership hitherto existing under the style of "William Hudson, Son, & Booth," architects and surveyors, Bennet's Hill, Doctors' Commons, having expired by the effluxion of time, Mr. William Hudson retires, and Mr. Arthur B. Hudson, F.S.I., and Mr. A. C. Bulmer Booth, A.R.I.B.A., will continue to practise at the same address under the style of "Hudson & Booth."

Electric Lighting.—The St. Pancras Vestry held a special meeting on Wednesday last, January 1, to consider the unanimous recommendation of its Lighting, Parliamentary, and General Purposes Committees to carry out an installation of electric lighting, under their Provisional Order obtained in 1883. The Vestry, by a large majority, adopted the recommendation, and instructed their engineer, Professor Henry Robinson, C.E., to prepare the necessary plans and specifications for a first installation of 10,000 private lights and ninety public lights, involving an outlay of about 60,000*l.*

Royal Engineer Establishment.—The first annual dinner of the Civil Royal Engineer Establishment staff took place at the Holborn Restaurant on Monday, the 23rd ult., Mr. J. Lewis Thomas, Chief Surveyor, in the chair.

Scottish Society for the Registration of Plumbers.—A discussion on the question of the materials and construction of soil-pipes took place on Dec. 27, in connexion with the Scottish Society for the Registration of Plumbers, in the Architectural Association Hall, George-street, Edinburgh. Mr. Robert Cox of Gorgie presided. Mr. Thomas R. Proctor read a paper opening the discussion. Treating first of material, the lead age, he said, was a thing of the past. Then we had the zinc age; and now we had come to the age of iron, in which some plumbers thought they had got a material competent for its purpose. He discussed the subject of the expansion of iron pipes, and the relation which the diameter of air-shafts should bear to that of the soil-pipes. He expressed the opinion that a system of soil-pipes and air-shafts within the house was better than an outside system. They could not have a proper current of air in an outside system; and with an inside system the ventilating-shafts could be carried to the ridge of the roof without any difficulty. A building, he said, could be so constructed as to have the pipes inside, and at the same time have them well isolated. For inside piping he favoured lead as a material. Mr. Walter Brodie expressed the belief that a good cast-metal pipe was the best pipe. Mr. Thomas Hume said he was of opinion that the size of the soil-pipe now used was too large. Friction was needed as well as flushing to keep pipes in order. As to material, he thought the lead soil-pipe was the best that could be got. No joint could be compared with a solder joint. He expressed the opinion that ventilating pipes should be tested every year as well as soil-pipes themselves. Bailie Russell also argued in favour of a smaller size of soil-pipe. In the matter of material, he expressed a liking for iron as compared with lead. Other speakers took part in the discussion, and Mr. Proctor replied. The ventilating shaft, he said, should be of the same size as the soil-pipe itself, in order to prevent the risk of syphonage. The Chairman, in proposing a vote of thanks to Mr. Proctor for his paper, remarked that the points in dispute, and which had been brought up in that discussion, were such as could be readily determined by experiment. A vote of thanks to the chairman brought the proceedings to a close. [We quote the foregoing report from the *Scotsman*, but we are entirely adverse to the views expressed in favour of smaller soil-pipes, which we think most mischievous.]

Civil and Mechanical Engineers' Society.—An ordinary meeting of this Society was held at the Westminster Palace Hotel on Dec. 18, the President, Mr. Henry Adams, M.Inst.C.E., in the chair. A paper was read on "Percussive Rock-drilling Machinery," by Mr. Reginald Bolton. After some remarks on the ancient methods of rock-boring, the author traced the history of early English invention in this direction and the gradual development of the machine drill. The busiest period of invention would appear to have been about 1865, when English, German, and American engineers were actively employed on the problem. The parent practical machine drill was "The Burleigh," and the author described the well-known "Ingersoll," "Eclipse," "Mayne," "Schram," and other machines. A number of practical details were given of value to the engineer who may have the charge of such machines. The consumption of power was referred to, and a number of records of good work done by various machines followed as an *agenda* which will be useful to engineers in selecting a machine for work in certain strata. A list of all the practical rock-boring machines was given by the author, together with diagrams of the leading machines and their details. A discussion followed, in which Sir George Burry and other visitors took part, chiefly devoted to elucidating the best proportions for these machines.

Failures in 1889.—According to *Kemp's Mercantile Gazette*, the "gazetted" failures in the building and timber trades last year were 711 as against 785 in 1888, 761 in 1887, 712 in 1886, and 663 in 1885. The *Gazette* remarks, "It seems pretty certain that we are now entering upon a period of prosperity; or, as we may put it, a cycle of good business. It is hard, if not impossible, to account for these changes in the fortunes of trade; for the risings and fallings in the commercial barometer. They are, in the main, quite inexplicable. But we can judge to some extent by statistics when an improvement has set in, and a steady rise all round the circle of trade is imminent and assured."

Mr. George Jennings's Sanitary Appliances and Materials.—The name of "George Jennings" is known all over the world. The founder of the firm did a very great deal, by his inventiveness and ready perception of what was wanted in the early days of sanitary reform, to help to realise the ideas of the then comparatively few architects and engineers who were fully alive to the importance of maintaining the public health. His sons, called upon to direct a very large and successful business built up by his skill and energy, are evidently not unmindful of the importance of maintaining the *prestige* of the firm, and they have just issued some new catalogues of hydraulic and sanitary appliances and materials of all kinds. In these catalogues there are figured and described so many appliances that it is difficult to single out any for special mention. Many of them have been tried by the test of years of practical use, and have not been found wanting; others are comparatively new aspirants for favour. Amongst these we may mention the "London" grate (George Jennings and E. P. Owens, patentees), which is a "terra-cotta warm fresh air ventilating grate" for slow or quick combustion. Judging from the plan and sections, it must be a very efficient grate, producing little smoke, owing to its comparatively perfect degree of combustion. Of baths, lavatories, water-closets, urinals, slop and wash-up sinks, plumbers' brass-work, traps, electric bells, speaking-tubes, stoneware goods, and what not, there is hardly any end, and as, with scarcely an exception, everything is of the best type, the careful perusal of these catalogues will be found very useful by architects, builders, and householders. Supplementary catalogues are devoted to public urinals, and to the architectural and other terra-cotta work manufactured by Mr. Jennings at the South-Western Pottery, Parkstone, Poole. This terra-cotta is a very effective material, capable of producing very good work,—in saying which, however, we must not be supposed to express approval of all the designs figured in the catalogue.

Tramway Extension.—The requisite notices have been given of the proposal to extend the Lea Bridge, Leyton, and Walthamstow Tramways over Lea Bridge westward to the point where the road narrows as it approaches the Clapton-road. There can be no question that this would be an improvement that would be much appreciated by the public, for, in spite of the inconvenience which the necessity of walking to the eastern side of Lea Bridge entails, the tramway is used by many thousands daily in the pleasure season, and is an obvious assistance to the many whose business takes them in that direction at all seasons of the year. We are sorry, therefore, to find that the Hackney Board of Works has taken an objection to the proposal now made, and cannot but think that the position the Board has taken up is the result of misunderstanding. It is true that in the previous Act to regulate the tramway there was a condition involving the widening of the west end of Lea Bridge-road, but it was in consequence of this and similar onerous conditions, we presume, that the tramway was not worked successfully. It has lately been taken in hand by a new company, under a new Act, and we hope the Hackney Board will take this into account, and withdraw their opposition to the new scheme of extension. To insist that the new company should carry out all that the old company proposed, would possibly result in disaster, and the public might be deprived of a means of communication which, from the figures placed before us, is evidently widely appreciated. At all events, Hackney folks should bestir themselves, and exercise the influence they possess to avert action which may have the effect of arresting the extension of a most useful line of communication with the country and Epping Forest.—*East London Observer.*

Very "Wide" Tendering in South Africa.—The *Johannesburg Star* of Nov. 27 contained the following paragraph:—

"A Barberton paper states that a firm in that town recently had occasion to call for tenders for certain work for which proper plans and specifications were issued. The accepted tender amounted to something under 100*l.*, while one enterprising man's estimate totalled up to over 5,000*l.*! The ambition of some is to make a 'pile' in one grand *coup.*"

We have seen not a few specimens of "wide" tendering in this country, but we certainly never saw a list of tenders in which the highest was *fifty times* as much as the lowest. Let us hope that the Barberton man whose tender was accepted at less than 100*l.* will not *lose* a "pile."

Architects as Scientists.—The second meeting of the winter session of the Northern Architectural Association was held on Monday evening last in the Old Castle, Newcastle, Mr. Joseph Oswald presiding. Mr. J. H. Morton, F.R.I.B.A., read a paper bearing on a paper of Mr. W. H. Dunn, read at the previous meeting, on "Architects as Scientists." In the course of his paper, Mr. Morton said (according to the report in the *Newcastle Chronicle*) he had jotted down some ideas which suggested themselves on reading Mr. Dunn's paper. In Mr. Dunn's paper the merits of engineering had been contrasted with the skill of architecture, to the disparagement of the latter. He (Mr. Morton) thought, with Professor Kerr, that the time had gone by for them as architects to pretend to know all things. Architects had to try to know too much as it was. He might, therefore, endorse Professor Kerr's idea that when any man had work to design of any real importance, which was out of the ordinary run of his practice, he need not be ashamed to say that he had called in the assistance of an engineer. On the other hand, why should the engineering constructor not occasionally call in the aid of the architectural designer? Why should all our building operations of the so-called engineering order,—viaducts, bridges, great roofs of railway stations, &c.,—be left barren and unfruitful of grace, because the designers of them, professing nothing of the artistic spirit themselves, assumed that it had no connexion with their work?

Memorial of the Royal Stewarts at Paisley Abbey.—The other day Sir Michael Shaw-Stewart, Bart., Lord-Lieutenant of Renfrewshire, unveiled, in the old Abbey grounds, at Paisley, a memorial to the Royal Stewarts buried there. The memorial, which has been erected by the order of her Majesty, the Queen, has been executed by Mr. John Hutchison, R.S.A., sculptor, Edinburgh, and is in the form of a recumbent sculptured cross, similar in style to those which may be seen at Iona and the Western Isles. The base, which measures 8 ft. by 4 ft., is of polished Peterhead granite; on the top of this rests a block of Sicilian marble with bevelled face, upon which is sculptured a Gothic cross of the period of the erection of the Abbey. On the right side is carved an ancient sword with belt entwined,—the symbol of kingly investiture; and on the left side is the Scottish shield with lion rampant, surmounted by a crown, and bearing on a scroll underneath the motto, "Nemo me impune lacessit." The members of the House of Stewart to whom the monument is raised are:—Marjory Bruce, the two Queens of Robert II., and Robert III. The monument has been placed on what is supposed to be the grave of King Robert III., which is situated in front of the high altar, at the east end of the ruined choir, behind the present church.

Threatened Water Famine in Bombay.—A special and urgent meeting of the Municipal Corporation was called for on Nov. 25 to discuss the scheme of Mr. Tomlinson, engineer-in-charge of the local waterworks, to provide against a threatened water famine in Bombay. Mr. G. Geary, the President, occupied the chair, and there was a large attendance of members. Major Selby proposed the following resolution:—"That subject to the sanction of the Government of India to the raising of a loan of Rs. 4,55,000, and in view of providing against an almost certain deficiency during the hot weather of 1892, and a possible deficiency during the hot weather of 1891, sanction be given, as recommended by the Standing Committee, to Mr. Tomlinson's scheme for bunding a water supply from Pawai, in the valley below the Vehar dams, and of pumping the impounded water into the Vehar storage reservoir and the mains leading therefrom at a cost of Rs. 4,55,000. That this estimate is exclusive of cost of land, that the land to be submerged will be about 500 acres, which will have to be immediately acquired, and that the question of acquiring the gathering ground may be considered later on. That, pending the raising of the said loan, the cost of this work be paid by advances from available balance to be adjusted against the loan. That, pending the like sanction, sanction be given to the acquisition of the land for the impounded area, the cost in the meantime to be met by similar advances."—*Indian Engineer.*

Removal.—Messrs. Croggon & Co. (Limited) have removed their offices and show-rooms from 200 to 16, Upper Thames-street, London, E.C.

Matheson & Grant's Engineering Trades' Report.—Messrs. Matheson & Grant, in their half-yearly report, issued on the 1st inst., say that there has not been, since the year 1875, so much activity in the engineering trades as during the last few months, and the present improvement is more widespread than in the case of any previous revival; for while on previous occasions export to the United States has been the main factor in determining the prices of iron and steel, such a measure of trade no longer applies. The increased demand for the services of British engineers, and for the products of engineering factories, comes now from all parts of the world. Bridges and structural ironwork are in general demand, and except for the delay in obtaining steel and iron from the rolling mills, manufacturers are well satisfied; for although prices have only slightly advanced beyond what is due to higher costs, the greater tonnage allows a better profit. At home the bridges for the Manchester Ship Canal are being made; the superstructure of the Tower Bridge is commenced; numerous bridges are being built in Dublin, Belfast, and elsewhere in Ireland; bridges are in progress for various new railways in England; while the strengthening and widening of existing bridges on the principal main lines add to the general demand. Market buildings, large hotels, station roofs, and buildings for steel works are examples of other structures now in progress. Competitive designs for the projected high tower in London are being prepared, and this project, if carried out, will surpass the Eiffel Tower in Paris, and render necessary about 10,000 tons of steel. Abroad, bridges and structures for India, Japan, Australia, and South America are being made in the English factories, but the present high prices are likely to restrict new orders for the coming year. Portland cement has been in increased demand during the last few months; prices have risen with the cost of fuel, material, and labour, and are likely to advance further from the same cause. The too frequent reliance of engineers on high tensile tests, rather than on care in the mixing and application of the concrete, has led to some failures in foundations built under such conditions. The specifying of unduly high tests which involve certain risks in quality are being less frequently imposed than formerly, as it is found that cement of the best-known English brands will give, in accustomed hands, the very best results. Attempts to rival such cement in countries where chalk as a material is wanting are made from time to time with unfavourable results.

The City Engineership, Liverpool.—According to the *Liverpool Daily Post*, a special meeting of the Health Committee of the Liverpool Town Council was held on Saturday, to consider the question of selecting a City Engineer in succession to Mr. Clement Dunscombe, who has been appointed Chief Engineer to the London County Council. There were forty-two applications for the position, and after a long sitting the Committee reduced them to seven, as follows:—Percy Boulnois, Borough Engineer of Portsmouth; John Price, Surveyor to the Toxteth Local Board; J. W. Brown, Borough Surveyor, West Hartlepool; A. E. White, Borough Surveyor of Hull; J B. M'Callum, Borough Surveyor of Blackburn; George Broom, Borough Surveyor, St. Helens; and R. E. W. Berrington, Borough Surveyor, Wolverhampton. The salary offered commences at 850*l.* a year. Since this was in type we learn that at a special meeting of the committee on Wednesday the names of Mr. Boulnois, Portsmouth, Mr. M'Callum, Blackburn, and Mr. A. E. White, Hull, were selected for further consideration.

Death of Mr. Thomas Oldham Barlow, R.A.—We regret to announce the death of Mr T O. Barlow, R.A., which took place at his house in Kensington on Christmas Eve, after an illness of two months. Since the death of Samuel Cousins, Mr. Barlow has been (says the *Times*) regarded as the *doyen* of English mezzotint and "stipple" engravers, and though he was twenty years younger than Cousins, he probably, at his best, came nearest to that eminent engraver in the opinion of his colleagues and the public. Born in 1824, at Oldham, young Barlow very early showed a taste for art; and though he had no artistic friends or interest, his father did not discourage him. At fifteen he was apprenticed to Messrs. Stephenson & Royston, engravers, of Manchester, and he worked in the then newly-established School of Design in that city.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	7	0	0	7	15	0
Teak, E.I. ....load	12	0	0	14	0	0
Sequoia, U.S. ....foot cube	0	2	3	0	3	0
Ash, Canada ....load	3	0	0	4	5	0
Birch ,, ...	3	0	0	4	15	0
Elm ,, ...	3	10	0	4	15	0
Fir, Dantsic, &c.	2	0	0	3	10	0
Oak ,, ...	2	10	0	4	10	0
Canada	5	10	0	7	0	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	3	0	0	5	5	0
Lath, Dantsic ....fathom	4	10	0	5	10	0
St. Petersburg	5	0	0	6	10	0
Wainscot, Riga, &c. ....log	0	0	0	0	0	0
Deals, Finland, 2nd and 1st. std. 100	8	10	0	11	0	0
,, ,, 4th and 3rd	7	0	0	8	0	0
Riga	7	0	0	9	0	0
St. Petersburg, 1st yellow	11	0	0	14	0	0
,, 2nd ,, ...	9	0	0	10	10	0
,, white	6	10	0	10	0	0
Swedish	7	10	0	16	0	0
White Sea	9	0	0	17	0	0
Canada, Pine, 1st	16	0	0	26	0	0
,, ,, 2nd	11	0	0	17	10	0
,, ,, 3rd, &c.	8	0	0	10	10	0
,, Spruce, 1st	9	0	0	11	0	0
,, ,, 3rd and 2nd ..	7	0	0	9	0	0
New Brunswick, &c.	6	0	0	8	10	0
Battens, all kinds	6	0	0	17	0	0
Flooring Boards, sq., 1 in., prepared, First	0	11	0	0	14	0
Second	0	8	0	0	10	6
Other qualities	0	6	0	0	7	9
Cedar, Cuba ....foot	0	0	4	0	0	5
Honduras, &c.	0	0	4	0	0	4½
Mahogany, Cuba	0	0	5	0	0	6½
St. Domingo, cargo average ..	0	0	5	0	0	6½
Mexican, cargo average	0	0	4½	0	0	5½
Tobasco ,, ...	0	0	5½	0	0	6½
Honduras ,, ...	0	0	5½	0	0	6½

TIMBER *(continued)*.	£.	s.	d.	£.	s.	d.
Box, Turkey ....ton	4	0	0	13	0	0
Rose, Rio	15	0	0	20	0	0
Bahia	14	0	0	18	0	0
Satin, St. Domingo ....foot	0	0	9	0	1	3
Porto Rico	0	0	10	0	1	6
Walnut, Italian	0	0	4½	0	0	6½
METALS.						
IRON—						
Bar, Welsh, in London ....ton	7	15	0	8	5	0
,, ,, at works in Wales	7	5	0	7	15	0
,, Staffordshire, in London..	8	10	0	9	10	0
COPPER—						
British, cake and ingot	55	0	0	56	0	0
Best selected	57	0	0	58	0	0
Sheets, strong	66	0	0	67	0	0
Chili, bars	50	5	0	0	0	0
YELLOW METAL ....lb.	0	0	5¾	0	0	6
LEAD—						
Pig, Spanish ....ton	14	5	0	14	7	6
English, com. brands	14	7	6	0	0	0
Sheet, English	0	0	0	0	0	0
TIN—						
Straits	97	10	0	0	0	0
Australian	98	0	0	0	0	0
English Ingots	102	0	0	0	0	0
Bars	103	0	0	0	0	0
Refined	104	0	0	0	0	0
OILS.						
Linseed ....ton	20	10	0	20	15	0
Cocoanut, Cochin	26	10	0	0	0	0
Ceylon	24	0	0	0	0	0
Palm, Lagos	25	10	0	0	0	0
Rapeseed, English pale	33	10	0	0	0	0
,, brown	32	0	0	0	0	0
Cottonseed, refined	21	10	0	0	0	0
Tallow and Oleine	21	0	0	40	0	0
Lubricating, U.S.	5	10	0	6	10	0
,, refined	7	0	0	12	0	0
TAR—Stockholm ....barrel	1	6	0	0	0	0
Archangel	0	15	6	0	15	9

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page
Designs for Galleries or Balconies, Twn-hall	Leeds Corporation	50*l.* and 25*l.*	Jan. 31st	ii.
New Baths, Winter Gardens, &c.	Harrogate Corporation	150*l.* 100*l.* 75*l.* & 50*l.*	Mar. 1st	ii.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Removal of Dust, &c. (one year) Regent's-pk	Crown Estate Paving Commissioners	*Official*	Jan. 8th	ii.
New Workhouse	St. Pancras Guardians	A. & C. Harston	Jan. 9th	xiii.
Guernsey Granite Spalls	Norwich Corporation...	P. P. Marshall	Jan. 11th	ii.
Temporary Infectious Diseases Hospital....	Hendon Local Board...	S. S. Grimley....	Jan. 13th	xiii.
Purchase and Pulling-down Building Mat.	School Bd. for London	*Official*	do.	xvii.
Filter Presses, &c.	Tottenham Local Board	J. E. Worth	Jan. 14th	xvii.
New Roof and Repairs to Schools, Edmonton	Strand Union	W. S. Cross	do.	xvii.
Works and Materials....	Wandsworth Bd.of Wks.	*Official*	do.	xv.
Heating School of Art	Canterbury Corporation	do.	do.	ii.
Making-up Roads, &c.	Wimbledon Local Bd.	do.	do.	xvii.
Slop Carts	Beckenham Local Bd.	do.	Jan. 20th	ii.
Drainage, &c., Works	Central Lond. Sch. Dist.	H. Jarvis & Son	do.	xv.
Enlargement of Post Office, Cardiff	Com. of H.M. Works...	*Official*	Jan. 21st	ii.
Concrete Paving	Gt. Yarmouth U.S.A....	J. W. Cockrill	Jan. 23rd	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Road Foreman	Hornsey Local Board...	48s.	Jan. 6th	xxiii.
Chief Surveyor of Main roads	Stafford C. C.	800*l.*	Jan. 8th	xxiii.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

CROYDON.—For rebuilding Messrs. Gould's premises, corner of High and Park streets. Mr. Alfred Broad, architect, 27, Dingwall-road, Croydon. Quantities by the architect:—

Garlick & Horton, Limited, London	£2,318 0 0
Higgs, Loughborough Junction	2,257 0 0
Crouch, Worthing	2,240 0 0
King Bros. & Co., Norwood....	2,109 0 0
Akers, Norwood	2,103 0 0
J. Smith & Sons, Norwood	2,082 0 0
Cook, Crawley	1,987 0 0
F. Docking, Croydon	1,965 0 0
Marriage, Croydon....	1,960 0 0
Holt, Croydon	1,959 0 0
Batley & Linfoot, Croydon	1,930 0 0
Martin Taylor, Croydon	1,928 0 0
J. & C. Bowyer, Norwood....	1,894 0 0
Good, Walthamstow	1,892 0 0
Hole, Sutton....	1,857 0 0
Wyatt, Sutton	1,847 0 0
Heywood, London	1,792 0 0
Stephenson, London	1,789 0 0
A. M. Deacon & Co., Norwood	1,781 0 0
Smith & Bulled, Croydon*	1,780 0 0
Harris, Sutton	1,722 0 0
Veale & Co., London	1,719 0 0
Stephens, East Grinstead....	1,389 0 0

* Accepted.

GERRARD'S CROSS (Bucks).—For heating by pure warm air "Bulstrode," Gerrard's Cross, the residence of Sir John Ramsden, Bart.:—

John Grundy (accepted)	£185 0 0

BIRMINGHAM.—For coffee-house and hotel, Station-street, Birmingham, for Mr. J. M. Shelley. Messrs. J. P. Sharp & Co., architects, Martineau-street, Birmingham:—

S. Taylor	£4,061 0 0
Moffat	4,001 0 0
W. & J. Webb	3,990 0 0
Whithouse....	3,953 0 0
Bowen....	3,827 0 0
Giles	3,795 0 0
Gill	3,785 0 0
Jones & Mason....	3,780 0 0
Harley & Son	3,763 0 0
Briley	3,717 0 0
Robotham	3,694 0 0
J. Webb	3,575 0 0
Gowing & Ingram (accepted)	3,498 0 0

HUYTON.—For heating Huyton Church. Mr. W. D Caröe, architect:—

John Grundy (accepted)	£160 0 0

LONDON.—For the erection and seating of the Hammersmith and West Kensington Synagogue, Brook-green, W. Mr. Delissa Joseph, architect, 17, Basinghall-street, E.C. Quantities by Mr. B. G. Thompson:—

W. G. Hornsey....	£5,384 17 6
Harris & Wardrop	3,463 0 0
T. Hussey	3,460 1 0
C. Kynoch & Co.	3,420 0 0
Woodward & Co....	3,420 0 0
W. & F. Croaker	3,316 0 0
B. Hosegood	3,249 0 0
Garlick & Horton, Limited	3,236 0 0
B. E. Nightingale	3,204 0 0
Chamberlen Bros.	3,130 0 0
W. M. Dobbs	3,039 0 0
Revised Estimates on Amended Plans.	
W. M. Dobbs	£2,016 0 0
Chamberlen Bros. (accepted)	1,970 0 0

LONDON.—For new club premises in the Rotherhithe New-road, for the Trustees of the South Bermondsey Club and Institute. Mr. T. L. Aubrey, architect; Mr. Wm. Mills, surveyor :—

Kirk & Randall	£1,788	0	0
Hart Bros.	1,645	0	0
Down, J.	1,626	0	0
Wells, B.	1,619	0	0
White, A., & Co.	1,579	0	0
Gregory & Co.	1,437	0	0
Roome, E. A.	1,420	0	0
Holloway, H. L. (accepted)	1,323	0	0

LONDON.—For pulling down and re-building the "Swan" public-house, Kingsland-road, for Mr. Richards :—

Staines	£1,969	0	0
Walker Bros.	1,938	0	0
Burgess & Algar	1,888	0	0
Anley	1,825	0	0
Todd	1,787	0	0

LONDON.—For providing bathing and other accommodation in wooden hut at the South-Western Fever Hospital, Stockwell, for the Metropolitan Asylums Board. Mr. Keith D. Young, architect :—

Lascelles & Co.	£390	0	0
King Bros.	349	0	0
Haywood	343	0	0
Wall Bros.	334	0	0
Hyatt	324	0	0
Seede	298	0	0
G. Godson & Sons, Kilburn	245	0	0
Bardell, Peckham	235	0	0

LONDON.—For repairs, and fittings, &c., to No. 31, Holborn, E.C., for the Middlesex Aërated Bread and Restaurant Company, Lim. Mr. Lawton R. Ford, architect, St. Thomas's-chambers, 24, Railway-approach, London Bridge, S.E. :—

Drew & Cadman	£530	0	0
J. Bullers	525	0	0
F. Britton	455	0	0
J. Marsland	435	0	0

LONDON.—For rebuilding No. 18, St. Swithin's-lane, E.C. Mr. Delissa Joseph, architect, 17, Basinghall-street, E.C. :—

Perry & Co., Tredegar Works (accepted), Bow.

LONDON.—For alterations, 37 and 38, Gutter-lane, E.C. Mr. Delissa Joseph, architect, 17, Basinghall-street, E.C. :—

W. Oatley & Son	£169	15	0
A. W. Hammond (accepted)	104	0	0

LONDON.—For sundry works and repairs to premises Nos. 8, 10, 12, 14, 16, 18, 22, 24, 26, 28, and 30, Garden Row, Southwark :—

McCormick and Son (accepted) £1,047 0 0

LONDON.—For heating the Church of the Holy Trinity, Dockhead, Bermondsey, for the Rev. Father Huggett :—

John Grundy (accepted) £130 0 0

LONDON.—For alterations to drainage and sanitary works and fittings at the Rotherhithe Infirmary, for the Guardians of St. Olave's Union. Messrs. Newman & Newman, architects, 31, Tooley-street :—

W. & H. Castle, Hope Works, Southwark Bridge-road (accepted) £465 0 0

[Full list of tenders appeared in the *Builder* of December 21.]

NORTH WOOLWICH.—For caretaker's house and temporary offices at new premises, Barge House Wharf, North Woolwich, for Mr. J. H. Sankey. Mr. F. H. Raiman, architect :—

W. J. Maddison	£385	0	0
J. W. Wyles	365	0	0
C. Robinson	350	0	0
J. Baxter	340	0	0
J. Noakes	325	0	0
Wm. Perry (accepted)	294	0	0

SMETHWICK.—For house, Bearwood-road, for Mr. G. Holland. Messrs. J. P. Sharp & Co., architects, Birmingham :—

Lennox	£823	0	0
Gill	810	0	0
Jones & Mason	808	0	0
Marshall	769	0	0
Light	735	0	0
Blackham	719	0	0
Walton Bros.*	716	0	0

* Accepted.

TENDRING (Essex).—For pulling down and erecting two cottages at "Bretts" Hall, Tendring, Essex, on the estate of Mr. D. E. Cardinal. Mr. J. W. Start, architect, Colchester :—

Canham, Weeley	£398	0	0
Saunders & Sons, Dedham	375	0	0
Smith, Wivenhoe	310	0	0
Dupont, Colchester (accepted)	265	0	0

WAKEFIELD.—Accepted tenders for erecting the Science and Art Schools, Wakefield. William Watson, architect, Wakefield :—

Flower Bros. (Excavating, Brick, and Stone)	£3,599	0	0
C. F. Rycroft (slating)	116	0	0
C. Driver (plastering)	125	0	0
Chas. Squires (carpenter and joiner)	751	5	0
Saml. Atkinson (plumbing, glazing, iron-work)	450	0	0
Goodall, Lister, & Goodall (painting)	29	18	0
	£5,071	3	0

[All of Lower Wakefield.]

WESTCOTES.—For heating Westcotes Church. Mr. Ewan Christian, architect :—

John Grundy (accepted) £155 0 0

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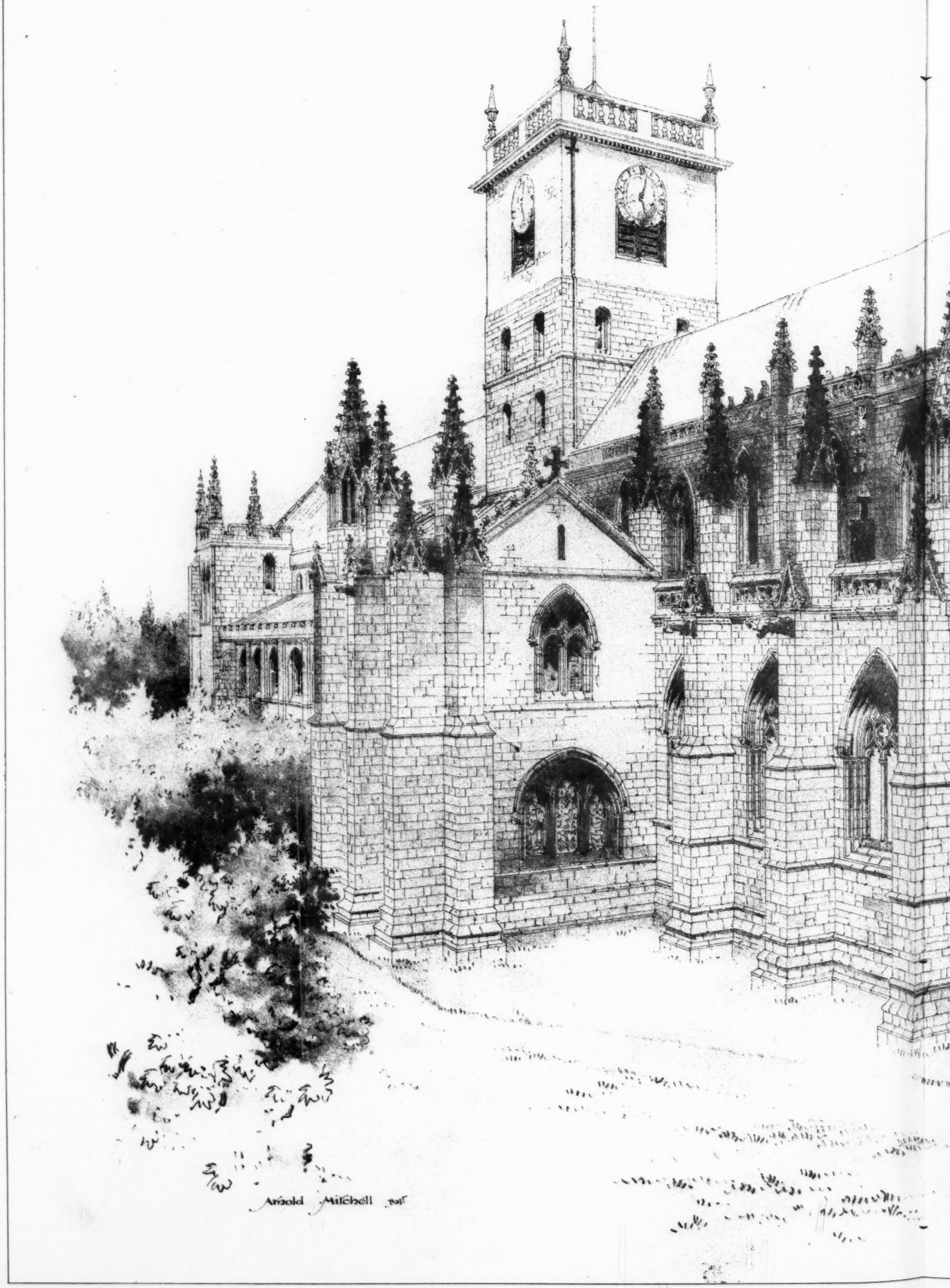

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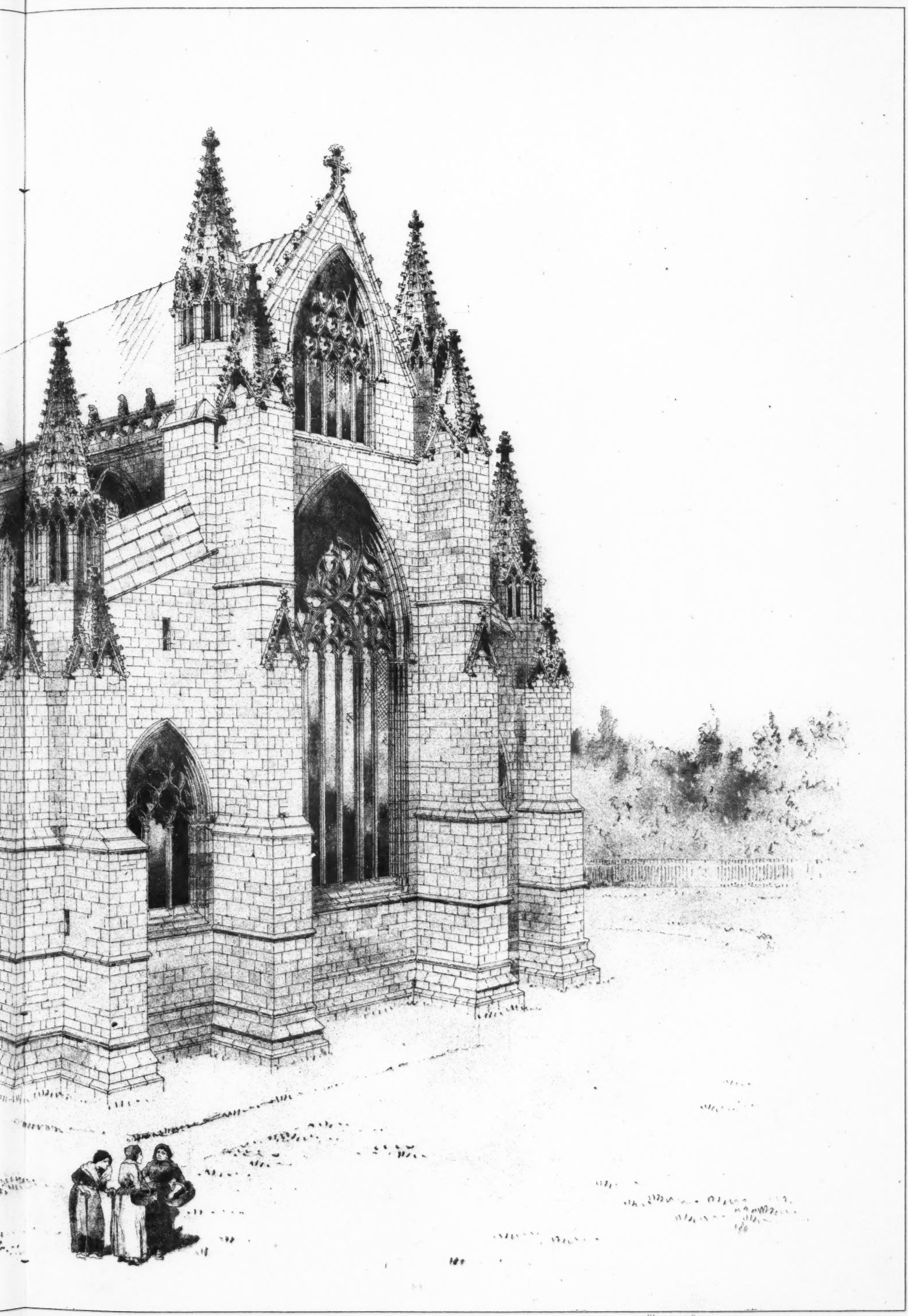

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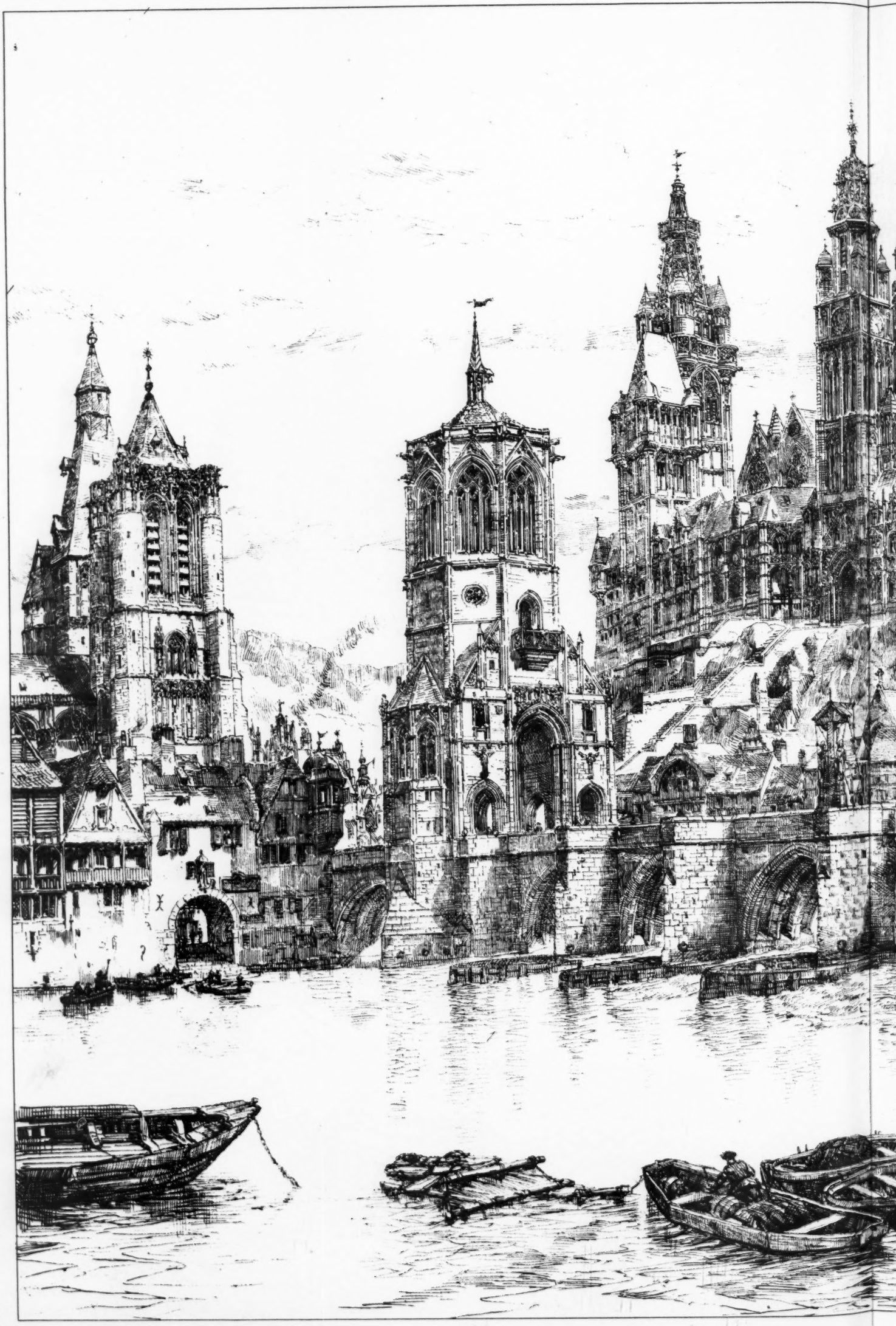

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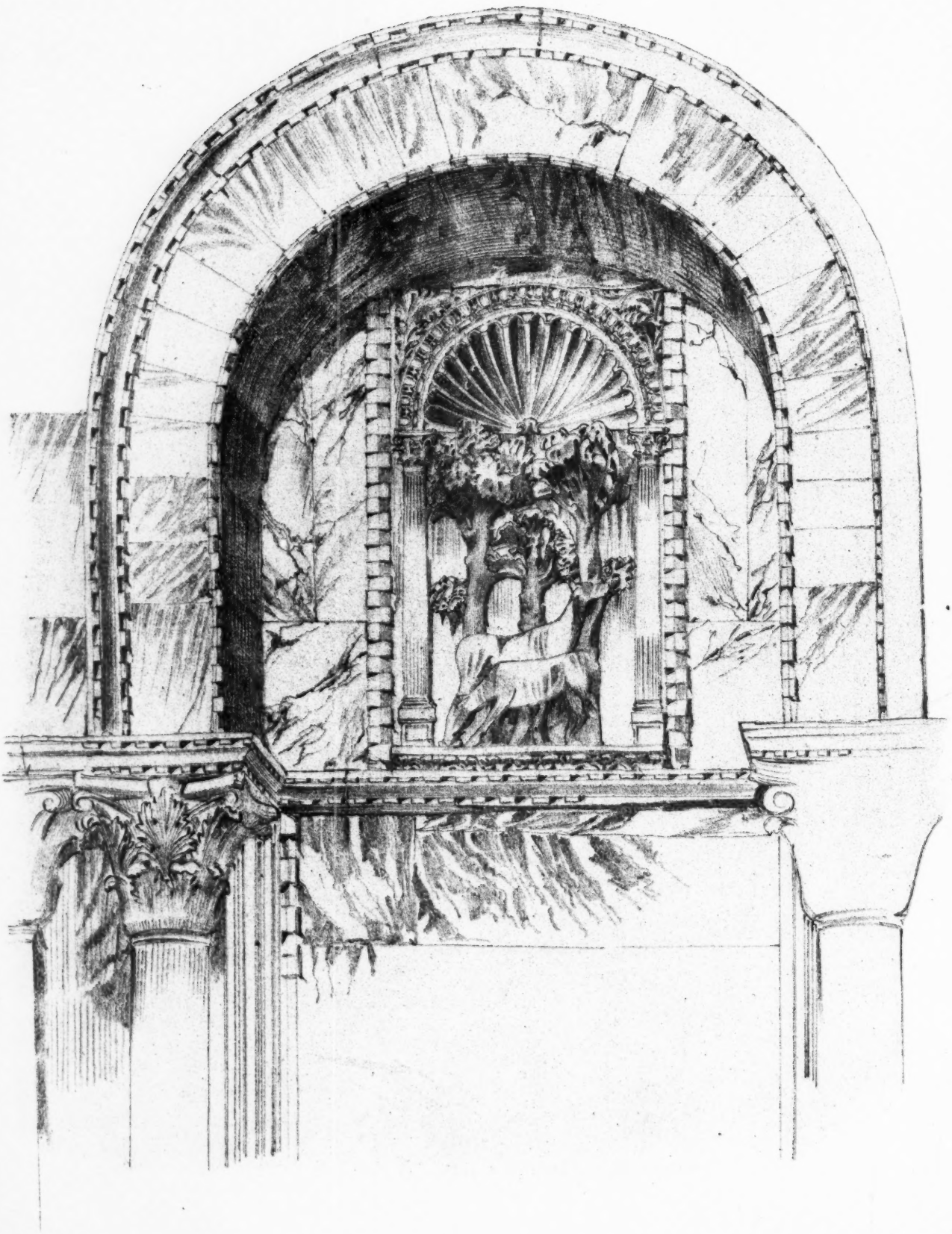

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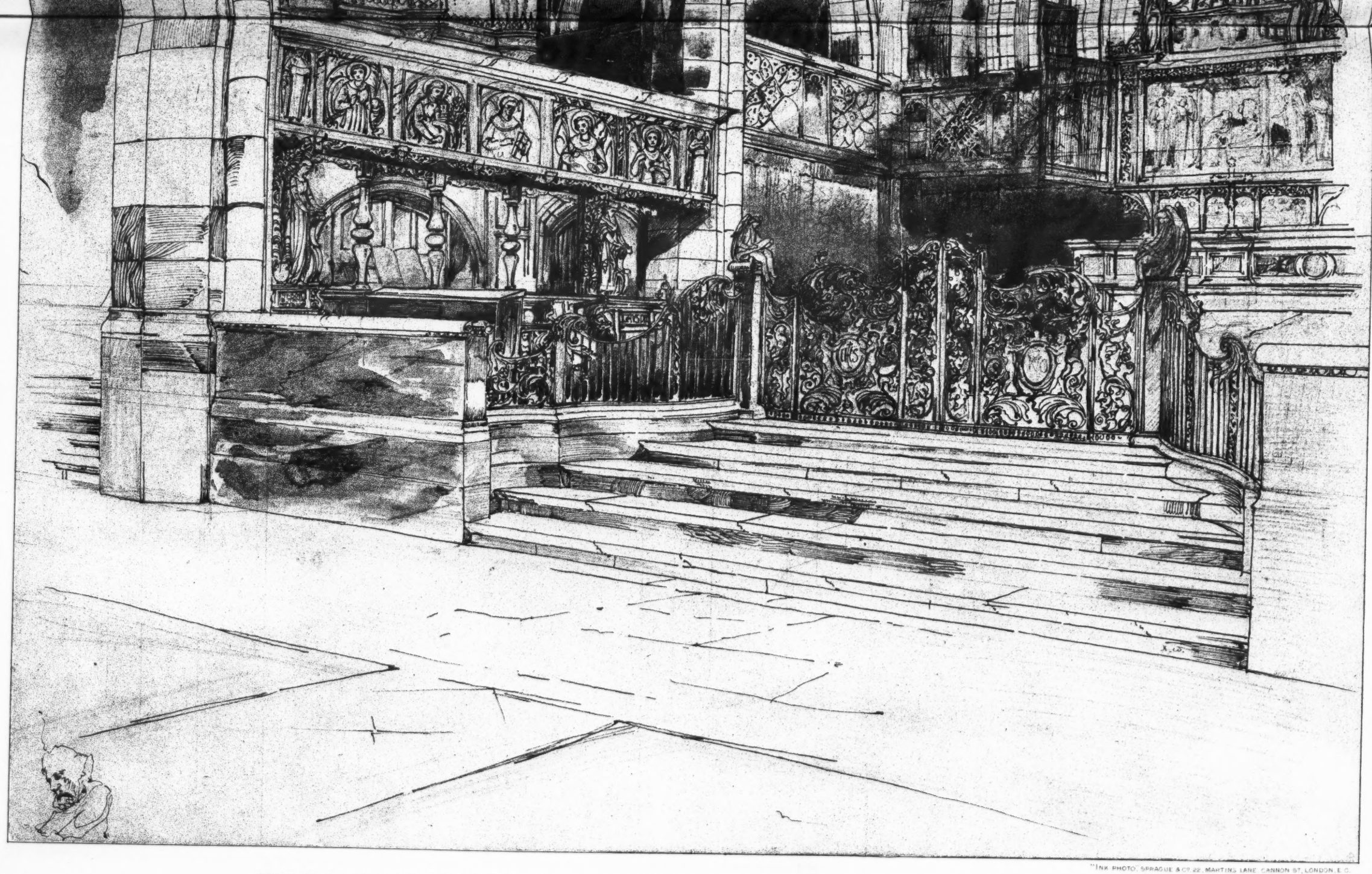

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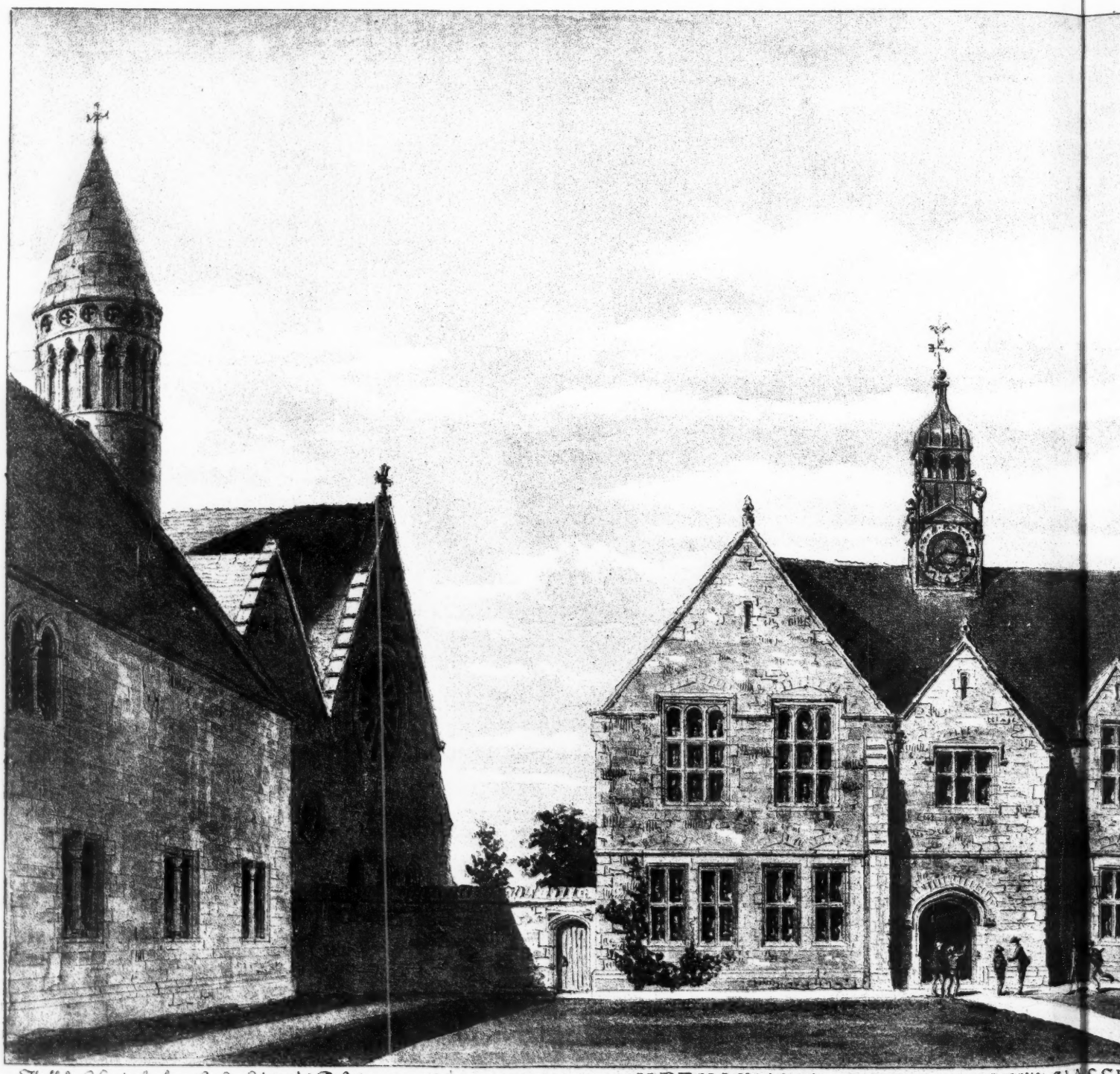

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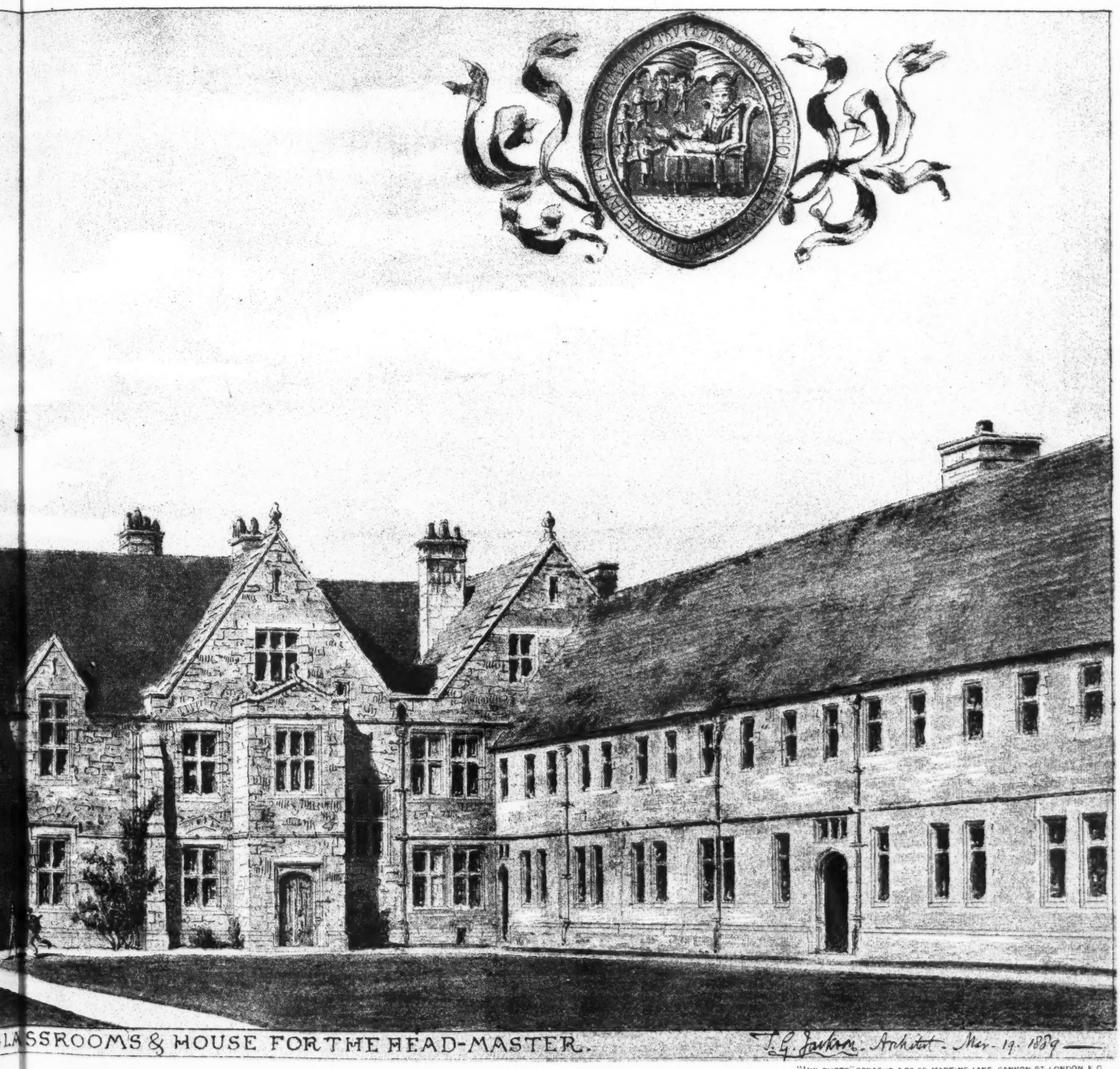

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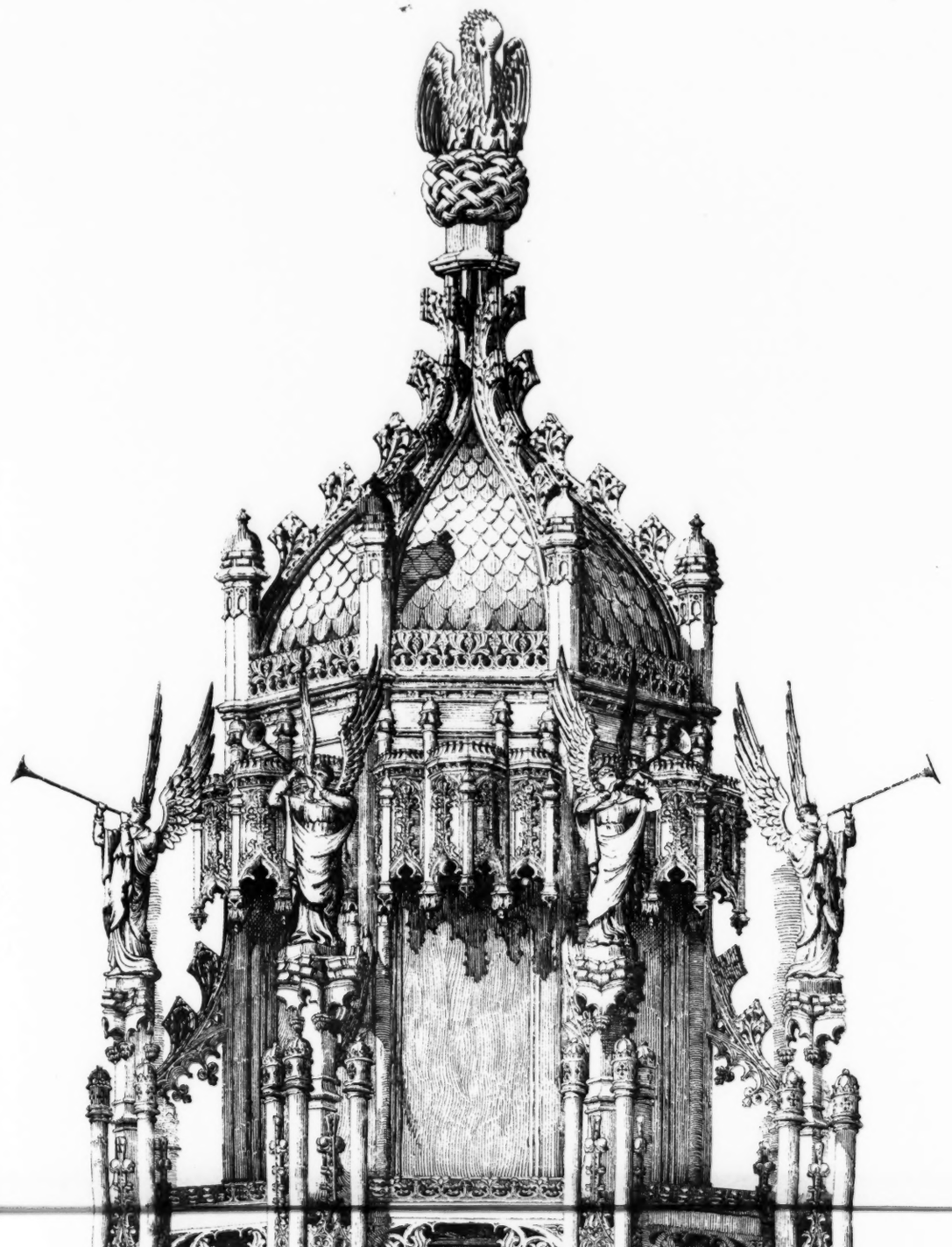

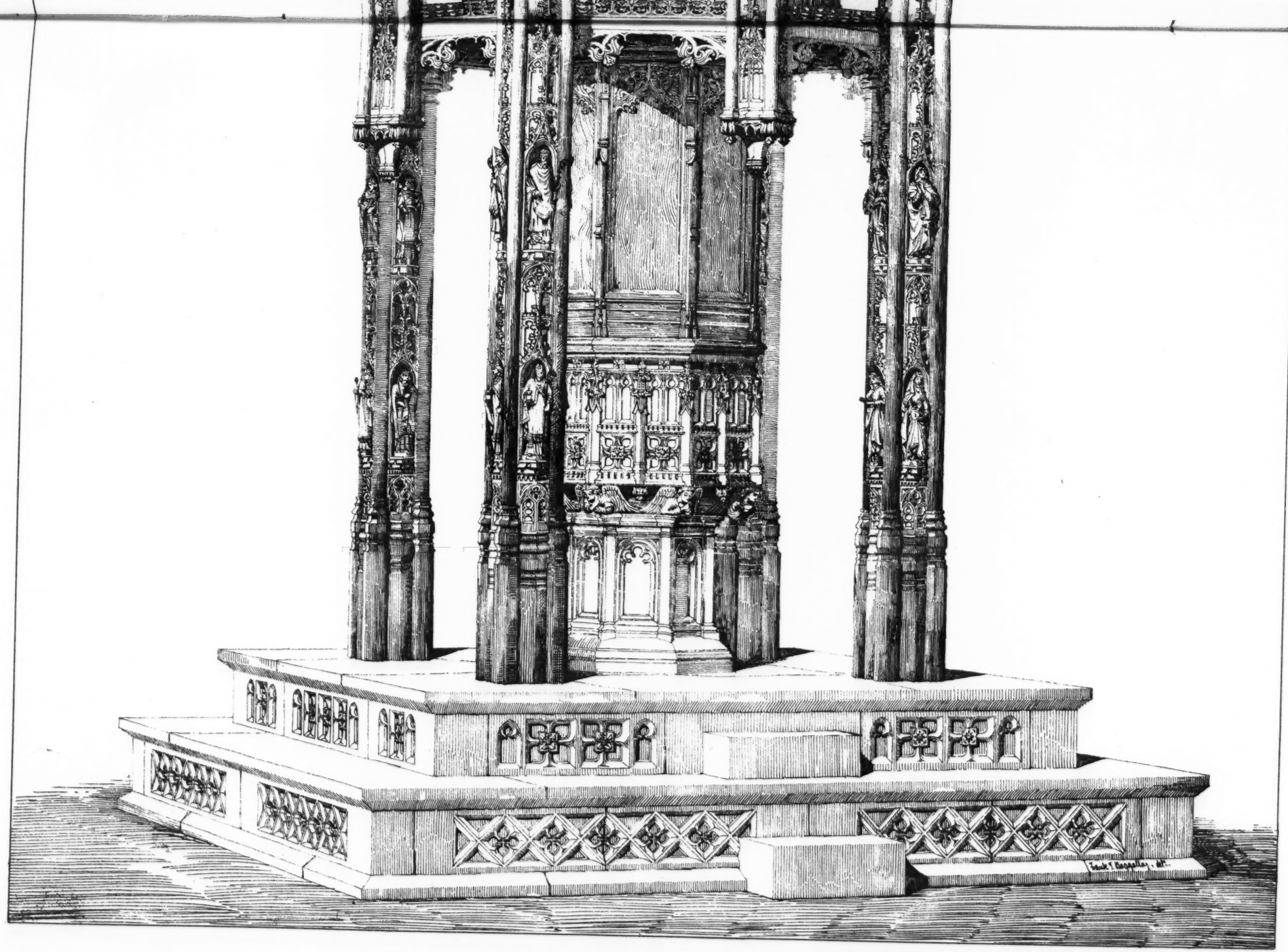

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